Pit and Quarry

With which is consolidated

CEMENT-MILL & QUARRY

December, 1934

NRA CODE GRAPHIC ARTS INDUSTRY 1934

Prepared to cement specifications

TECHNICOAL

PROCITE TREATED

1 Less coal per barrel.
2 Lower grinding costs.
3 Greater tensile strength.
4 Better cement color.
5 Uniform operating conditions.
6 Uniform cement clinkers.
7 Shortened burning zone.
8 Lowered sulphur content.
9 Reduced kiln ring formation.
10 Maximum kiln operation.

POWHATAN COAL also Procite Treated

Write for complete booklet on this modern fuel.

TECHNICOAL SALES CORPORATION

Exclusive Sales Agents

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THIS IS NUMBER ONE OF A SERIES OF TECHNICOAL ADVERTISEMENTS

Pages 17-21

Seal-clad Motors

MOULDED BAKELITE SHIELDS
PROTECT THE WINDINGS

CONSTRUCTION FEATURES

Frame—cast steel with feet cast integral.

Stator Core—twistless, distortionless, and self supporting.

Stator Windings—Seal Clad; mechanically protected from dust and moisture.

Rotor—indestructible; bars silver brazed to end rings.

Ball Bearings—mounted in dust tight cartridges.

Sleeve Bearings—sealed enclosure prevents entrance of dust and dirt and escape of lubricant.

Permanent Coil Protection

WITH the new Seal-Clad construction, introduced by Allis-Chalmers, induction motors are now provided with hard, smooth Bakelite shields sealed over the stator coils, giving protection against damage from metallic dust, grit, oil, moisture, mild acids and other agents injurious to insulation.

SEAL-CLAD motors are of the open type and are built in ratings up to 25 hp, 1800 rpm.

See nearest Allis-Chalmers district office or write for Leaflet 2182.

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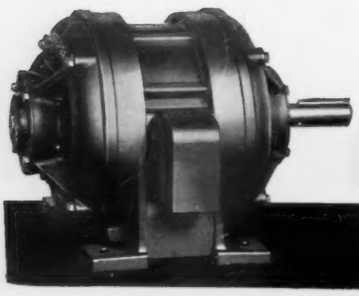
MILWAUKEE, WISCONSIN



ALLIS-CHALMERS
SEAL-CLAD MOTORS

FOR MORE WORK MORE TRIPS AND GREATER PROFIT

THE GMC T-33 TRUCK IN THE 3-TON RANGE

Look where they will and compare as they wish, buyers of trucks in the 3-ton capacity range can make no better selection than the General Motors T-33. In every detail of its rugged make-up, this "engineered-for-the-job" money maker challenges on the score of downright value. *In fact, not one truck in its capacity range matches the T-33 on more than 3 of the 12 important counts that definitely assure greater performance, increased economy and longer life*—counts such as high sustained torque, frame stiffness, payload capacity and valve-in-head performance, to list but a few.

Pages could be devoted to a description of T-33 superiorities, but the most convincing way to judge its merit is to call in a General Motors Truck representative and ask to be shown the truck itself and the facts to prove why this staunch worker and earner is every inch an exceptional value at its comparatively low price—a far greater value than any other truck of comparable size.

● *Whatever your hauling needs may be, there's a GMC truck or trailer to fit exactly—capacities range from 1½ to 22 tons.*

GENERAL MOTORS TRUCKS AND TRAILERS

GENERAL MOTORS TRUCK COMPANY
PONTIAC, MICHIGAN
Time Payments Available Through Our Own Y. M. A. C.

MAY 25 1935
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Pit and Quarry

With which is consolidated
CEMENT-MILL & QUARRY

Volume 27 December, 1934 Number 6

MEMBER AUDIT BUREAU OF CIRCULATIONS

Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel and other non-metallic minerals. Entered as second-class matter November 28, 1932, at the Postoffice at Chicago, Ill., under the Act of March 3, 1897.
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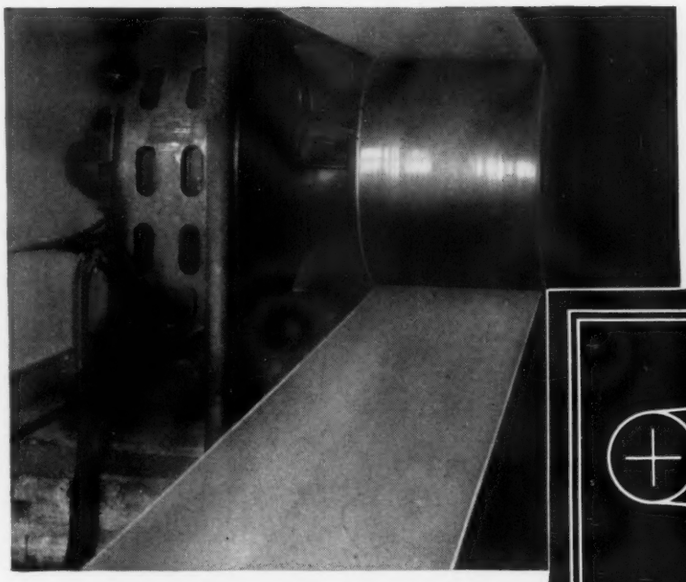
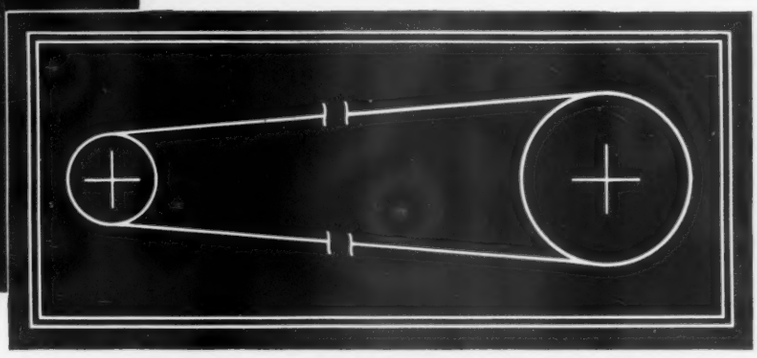
DOWN CAME BELT COSTS 50%



FOUR DIFFERENT SIZES OF GOODYEAR COMPASS BELTS SET NEW RECORDS FOR OPERATING ECONOMY



All G.T.M. Specified

YOUR operations may call for a much different type of belts from those used in the Weston & Brooker stone plants and quarries in South Carolina.

But you want exactly the same thing they required—and are getting: *lower costs — less trouble — fewer replacements.*

FOUR HARD DRIVES

They have several different drives in their three plants — vibrating screens *(very severe)*, air compressors, main gyratory crusher *(another tough one)*, and a large jaw crusher.

They had the G.T.M.—Goodyear Technical Man—study the special requirements of each of these drives. He specified four Goodyear COMPASS ENDLESS CORD belts — three single construction, and one double construction.

No. 1, on the vibrating screen, ran 31 months as against best previous belts' 4 to 6 months, saving $142.

No. 2 — air compressor — has run over 2½ years and looks good for 2 more, as against best previous 2½ years, at less than half the cost of that belt.

Nos. 3 and 4 are giving comparable saving service after 2 years' and 3 years' continuous operation.

You, too, can get similar cost-saving service from Goodyear belting, scientifically built and accurately specified to your operations. The G.T.M. is qualified to make the right recommendations for you.

Why not call in the G. T. M.? Write to Goodyear, Akron, Ohio, or Los Angeles, California, or your nearest Goodyear Mechanical Rubber Goods Distributor.

FREE *for* belt users ONLY

Send for latest edition Goodyear Handbook of Belting, a valuable reference book containing 160 pages of facts, tables and calculations to assist you in selecting correct types of transmission and conveyor belts. Because of its high value, offer is made *only* to persons qualified to use its technical data. Requests should show writer's title, department and company. Handbook will be delivered personally by Goodyear representative. Ask for HANDBOOK OF BELTING MB-13B.

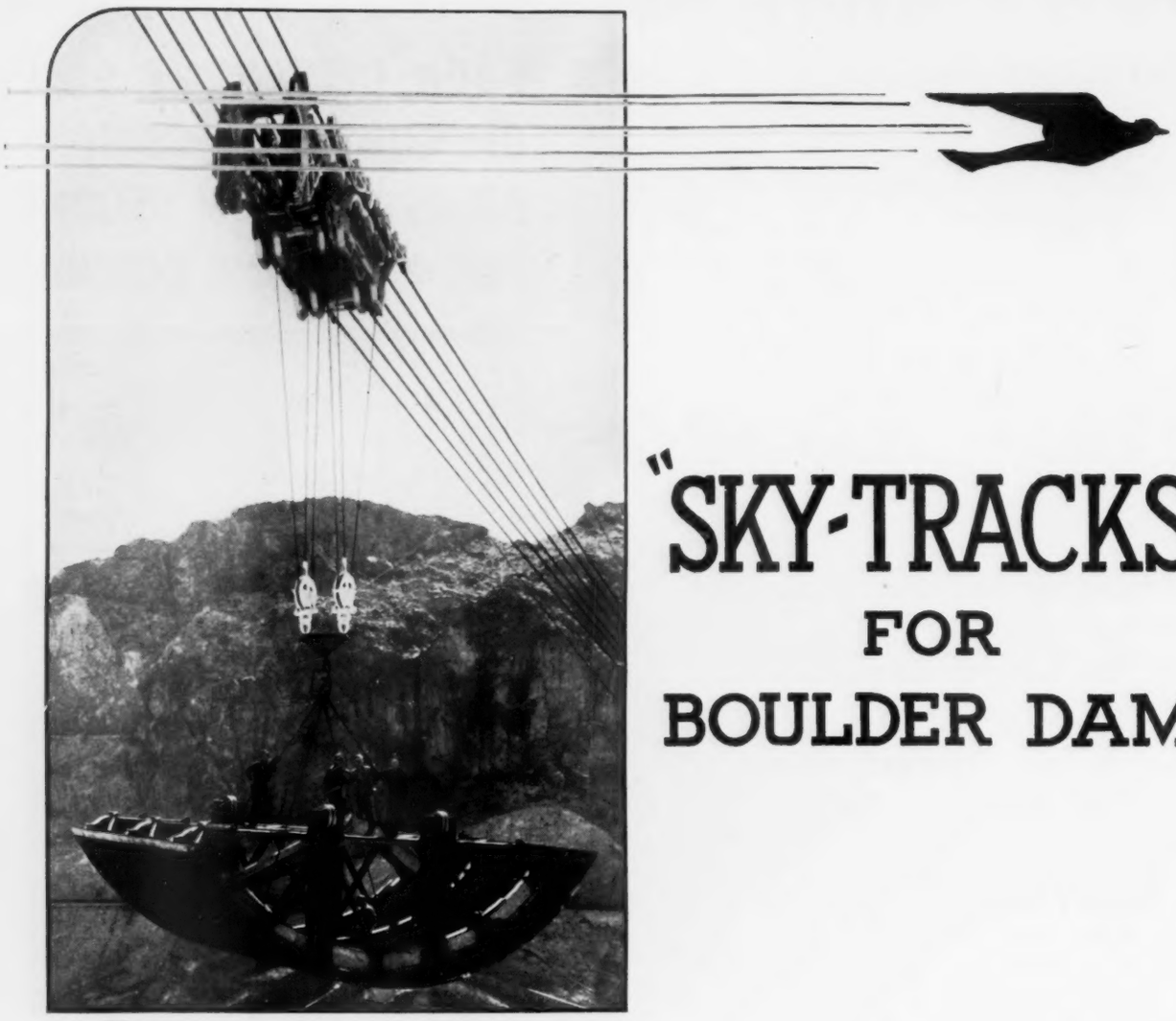
BELTS • MOLDED GOODS
HOSE • PACKING
MADE BY THE MAKERS OF GOODYEAR TIRES

THE GREATEST NAME IN RUBBER

GOODYEAR

NRA CODE

THE AIR ROADS ARE ALWAYS OPEN



"SKY-TRACKS" FOR BOULDER DAM

The World's Heaviest Duty Permanent Cableway—150 Ton Capacity

The TIGER TRADE MARK is a symbol of Strength and Dependability
THE MARK FOR GENUINE AMERICAN WIRE ROPE

HIGH above the Black Canyon of the Colorado River man has stretched a slender web of steel—built "Sky-Tracks" across the abyss that for centuries seemed impassable. The Lidgerwood Cableways—essential to the completion of Boulder Dam—represent spans of from 1365 to 2575 feet. To assure maximum service and economy—they are equipped with American Steel & Wire Company Track Cables. With breaking strengths in excess of 500 tons each—they enable safe and rapid movement of materials and supplies. In connection with your own aerial transportation problem—whether it be large or small—you will find American Steel & Wire Company quality and service of exceptional value. We invite you to correspond with us.

1831 MORE THAN 100 YEARS of PROGRESS in WIRE MAKING 1934

AMERICAN STEEL & WIRE COMPANY

208 South La Salle Street, Chicago
94 Grove Street, Worcester

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AND ALL PRINCIPAL CITIES

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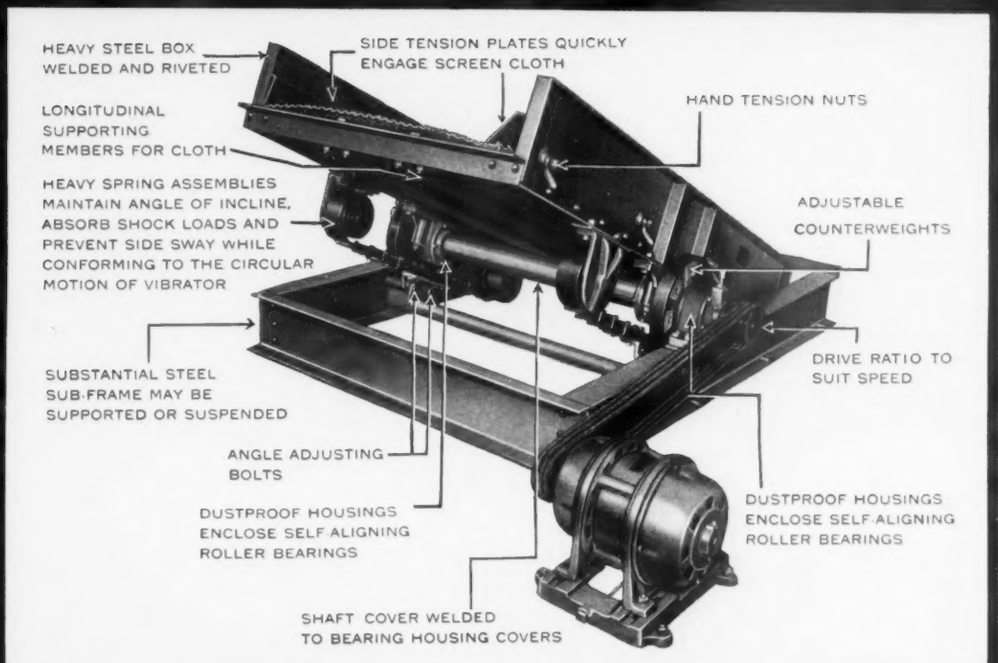
FOR EFFICIENCY-SIMPLICITY-HIGH CAPACITY AND LONG LIFE

LINK-BELT VIBRATING SCREEN


HEAVY STEEL BOX WELDED AND RIVETED
SIDE TENSION PLATES QUICKLY ENGAGE SCREEN CLOTH
HAND TENSION NUTS
LONGITUDINAL SUPPORTING MEMBERS FOR CLOTH
HEAVY SPRING ASSEMBLIES MAINTAIN ANGLE OF INCLINE, ABSORB SHOCK LOADS AND PREVENT SIDE SWAY WHILE CONFORMING TO THE CIRCULAR MOTION OF VIBRATOR
ADJUSTABLE COUNTERWEIGHTS
SUBSTANTIAL STEEL SUB-FRAME MAY BE SUPPORTED OR SUSPENDED
DRIVE RATIO TO SUIT SPEED
ANGLE ADJUSTING BOLTS
DUSTPROOF HOUSINGS ENCLOSE SELF-ALIGNING ROLLER BEARINGS
DUSTPROOF HOUSINGS ENCLOSE SELF-ALIGNING ROLLER BEARINGS
SHAFT COVER WELDED TO BEARING HOUSING COVERS

1 Mechanically operated with few moving parts, resulting in low operating and maintenance costs.

2 No dead screening areas. Method of imparting uniform intensity of vibrations, results in maximum efficiency, capacity and long life.

3 The screen cloth is entirely unobstructed, permitting free passage of material. Especially well adapted for the application of water sprays when washing, because of the uniform beds of material running down at a steady rate.

4 Angle of incline of screen can be readily changed to suit conditions.

5 Heavy combination coil and leaf spring assemblies maintain angle of incline, absorb shock loads and prevent side sway while conforming to circular motion of vibrator.

6 Only the screen cloth needs to be removed when cloth replacements are necessary. Simple and easy.

7 Mounted on substantial steel base which permits supporting below or suspension by cables from above. Readily fits into existing conditions requiring less space.

8 All bearings are exact duplicates of the self aligning roller type, enclosed in dust proof housings.

Send for This Book No. 1462

LINK-BELT COMPANY

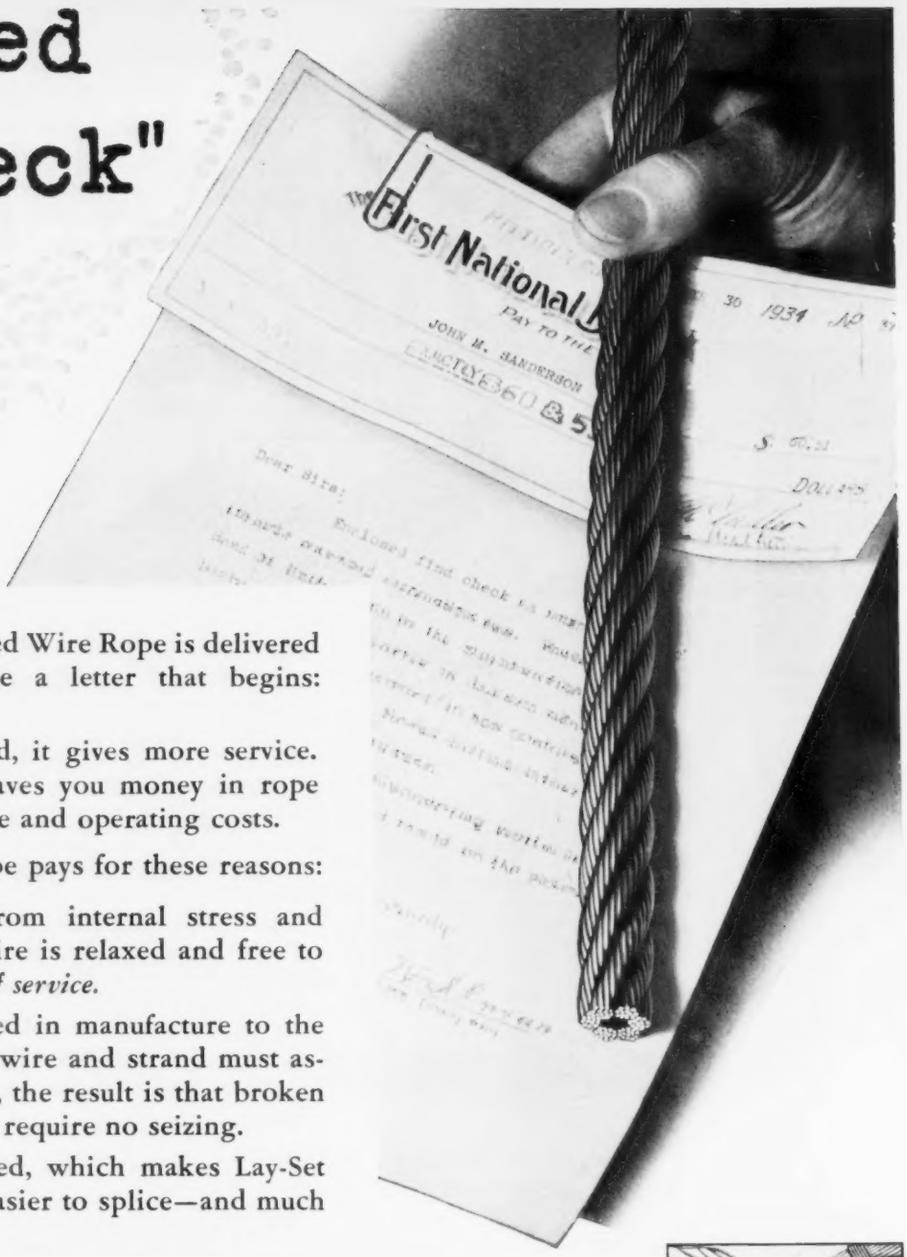
5138

Leading Manufacturers of Equipment for Handling Materials Mechanically and Transmitting Power Positively

CHICAGO . . . PHILADELPHIA . . . ATLANTA . . . INDIANAPOLIS . . . SAN FRANCISCO . . . TORONTO

Offices in Principal Cities

"Enclosed find check"



WHEN Lay-Set Preformed Wire Rope is delivered to your job it is like a letter that begins: "Enclosed find check."

Because Lay-Set is preformed, it gives more service. Because it lasts longer, it saves you money in rope replacement, in handling time and operating costs.

Lay-Set Preformed Wire Rope pays for these reasons:

1. Preforming frees it from internal stress and strain. Therefore each wire is relaxed and free to give you its *full measure of service.*
2. Having been preformed in manufacture to the exact helical shape every wire and strand must assume in the finished rope, the result is that broken wires lie flat and cut ends require no seizing.
3. It is completely relaxed, which makes Lay-Set much easier to handle—easier to splice—and much less likely to kink.

Send for a sample of Lay-Set Preformed Wire Rope. Take it apart and put it together again—it's fascinating, the way each strand cuddles into place. Examine it thoroughly and see for yourself why that sample is like a good bank check—why a reel of Lay-Set for your machinery would be, through money saving, like a letter which said: "Enclosed Find Check."

UNRETOUCHED PHOTO OF ORDINARY WIRE ROPE

UNRETOUCHED PHOTO OF LAY-SET PREFORMED WIRE ROPE

HAZARD WIRE ROPE COMPANY

Wilkes-Barre, Pennsylvania

New York Chicago Fort Worth San Francisco Philadelphia
Pittsburgh Denver Los Angeles Birmingham Tacoma

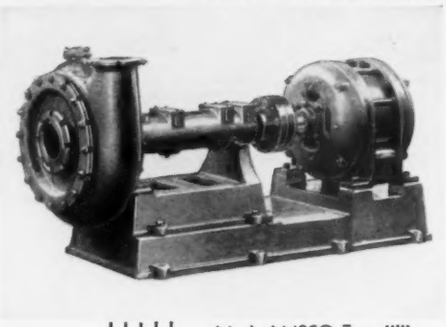
NRA CODE

LAY-SET *Preformed** Wire Rope

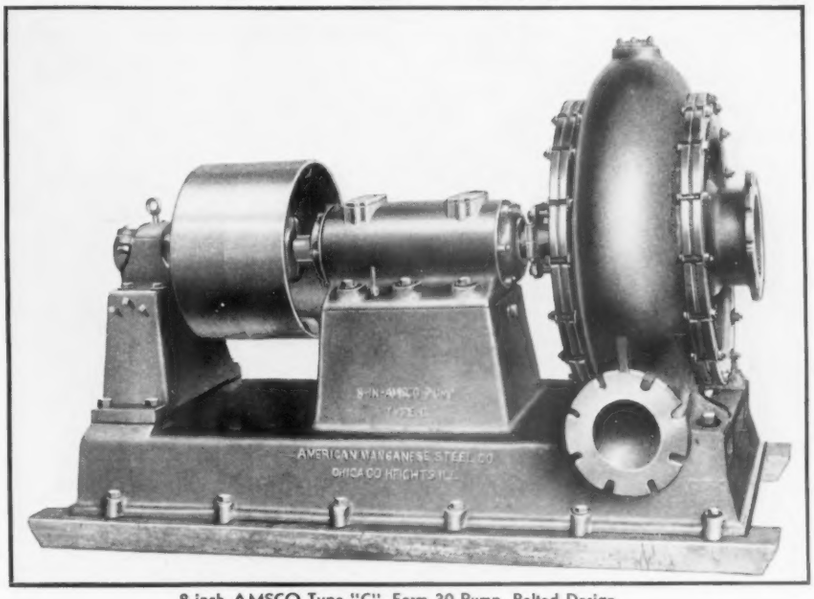
***PREFORMING IS A PATENTED MANUFACTURING PROCESS APPLICABLE TO ANY TYPE, GRADE, CONSTRUCTION AND LAY OF WIRE ROPE**

AMSCO DREDGE PUMPS

TRADE MARK REGISTERED



6-inch AMSCO Type "I", Form 20 Pump, Directly Connected Design with Electric Motor, Right Hand, Top Discharge.



8-inch AMSCO Type "C", Form 30 Pump, Belted Design, Left Hand, Bottom Discharge.

Embody— DURABLE CONSTRUCTION AND LASTING EFFICIENCY

AMSCO Dredge Pumps reflect their ability to stand up when being pressed the hardest for production. They afford maximum protection against operation shutdowns.

AMSCO Dredge Pumps have been carefully designed to meet all the requirements of sand and gravel pumps. All wearing parts are made of manganese steel. They stand up under the severest tests. Their use will save delays and reduce operating costs.

AMSCO Pumps embody: sturdiness with rigidity of construction; simplicity; unusually heavily proportioned shafts and bearings with maintained accuracy of shaft alignment; ample lubrication for bearings with free-flowing oiling facilities, together with large oil reservoirs; accessibility and quick, positive impeller adjustment; ease of replacement of wearing parts; and remarkably high capacity under severe head conditions.

The continued success of AMSCO Pumps is due to a policy of building with quality, assuring Durable Construction and Lasting Efficiency, and their correct installation by experienced engineers familiar with the problems involved in pumping abrasive materials.

AMSCO Pumps are built in standard 3-inch, 4-inch, 5-inch, 6-inch, 8-inch, 10-inch, 12-inch, 16-inch, and 18-inch sizes for all types of drives.

Pumps built to meet individual user's requirements.

Flap Valves, Elbows, Pipe, Pipe Flanges, Ladders, Drive Gears, Cutter Heads, Teeth.

We invite your inquiry for performance data and details on the type of AMSCO pump best suited to your operations.

AMERICAN MANGANESE STEEL COMPANY

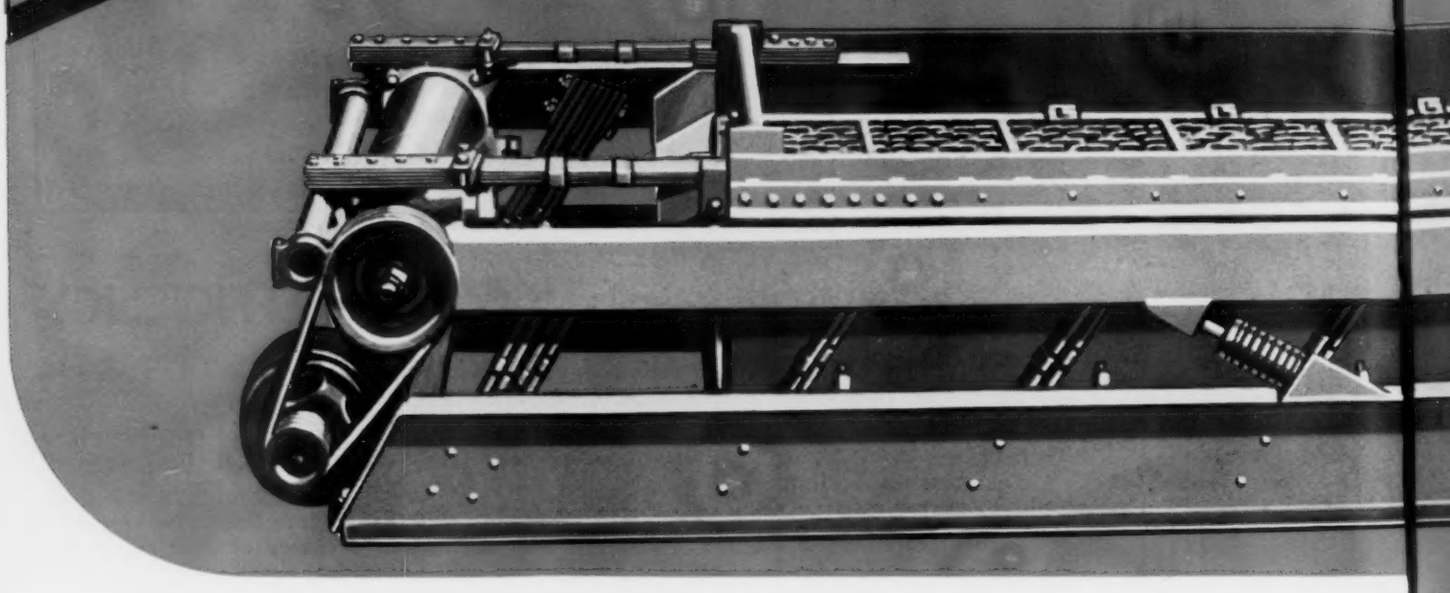
Owned by American Brake Shoe & Foundry Company

396 East 14th Street, Chicago Heights, Ill.

Foundries at Chicago Heights, Ill.; New Castle, Del.; Denver, Colo.; Oakland, Calif.; Los Angeles, Calif. • Offices in Principal Cities.

In sand and gravel plant equipment you can best combat rapid wear due to abrasion and breakage due to shock by using cast parts of AMSCO manganese steel. We will be glad to furnish detailed information on request. Send complete details of your requirements with inquiry.

THE SYMONS IS

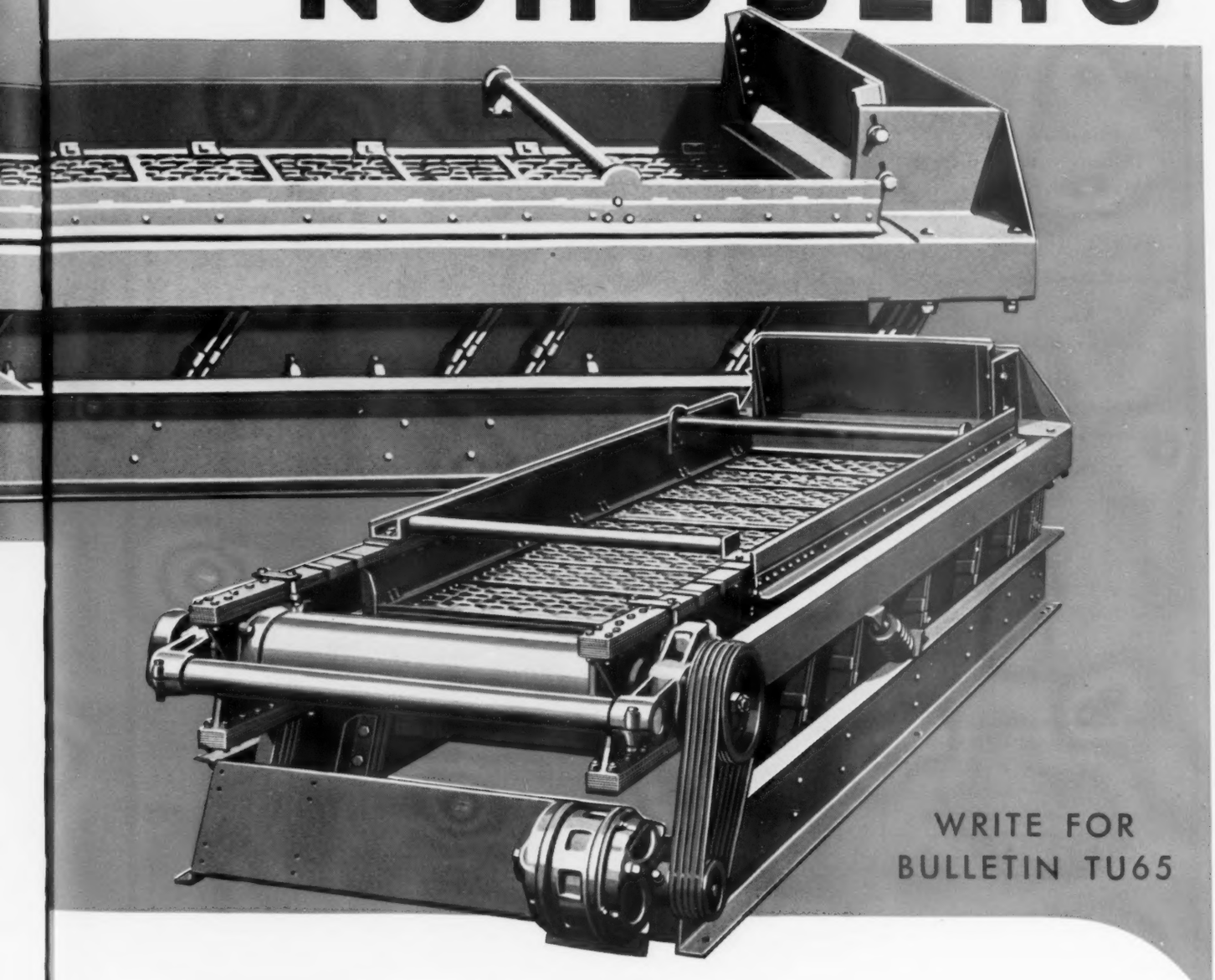


LOOK AT THESE FEATURES

- Sets level
- Saves headroom
- Easily installed
- Automatic feed
- Close grading
- All bearings dust tight
- Weight of screen deck not carried on bearings
- Entire screen area has same movement
- All vibrating parts are counterbalanced
- For dusty operations can be completely enclosed, with bearings and motor outside of dust housing

SCREEN

announced by NORDBERG



WRITE FOR
BULLETIN TU65

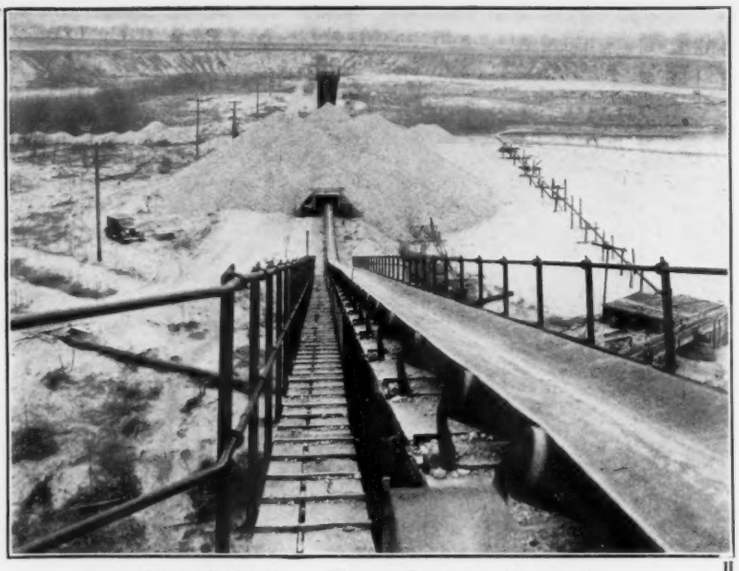
NORDBERG MFG. CO. MILWAUKEE

NEW YORK CITY
60 East 42nd St.

LONDON WC2, ENG.
Bush House

LOS ANGELES
Subway Term. Bldg.

This Plant Is a MONEY SAVER *as* PERFORMANCE PROVES:



Part of the Terre Haute, Indiana, Plant of Wabash Sand & Gravel Company

Commenting on the operation of his new Robins conveyors, Mr. L. F. Hart, General Manager, reports his observation of these economies:

1. Substantial power saving due to lowered head and shortened pipe line.

2. Small cost of laying and maintaining short remaining length of pipe.

3. Saving from wasting sand (up to 75%) at dewatering station instead of running it through plant.

4. Dredge operation is not stopped when tipple crew cleans cars.

5. Facilities provided by surge storage permit independent operation of dredge or tipple and are decided advantage in control of production.

6. Quality of gravel product is improved due to picking before crushing and sizing.

Using Robins engineering and equipment, the Wabash Sand and Gravel Company replaced a long pipe line with 1,100 ft. of 24 in. Robins belt conveyor.

This belt receives its feed from a dewatering box close to the dredge, the gravel first being scalped from the sand and water and carried for a short distance on a slow-moving belt for picking.

The clean gravel and whatever part of the sand is wanted (balance of sand is wasted at the dewatering box) are loaded on the 24 in. conveyor and delivered to a surge storage pile of 10 hrs. capacity, to balance dredge production and plant demand.

Material is reclaimed from the surge pile as wanted, and at an even rate, by tunnel conveyor to the washing and loading plant.

ROBINS—
Complete equipment for handling and classifying pit and quarry products

The careful study of this problem by Robins engineers and the use of Robins sand and gravel handling equipment produced excellent results for the Wabash Sand and Gravel Company.

We Can Serve YOU with Equal Success

ROBINS CONVEYING BELT COMPANY

15 Park Row, New York — **Old Colony Bldg., Chicago**

Boston
Charleston, W. Va.
Cleveland
Detroit

MATERIAL HANDLING ROBINS EQUIPMENT

Representatives in other principal cities

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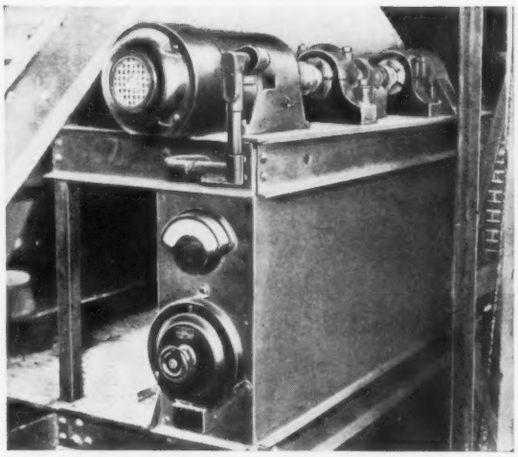
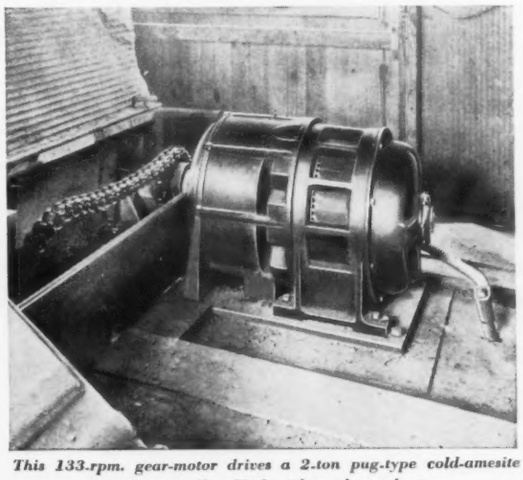
Pittsburgh
London
Johannesburg

TO CUT INSTALLATION COST SAVE SPACE REDUCE MAINTENANCE

....use G-E GEAR-MOTORS



Here's a totally enclosed, fan-cooled, adjustable-speed gear-motor direct-connected to a screw conveyor feeding a kiln in a mid-western plant

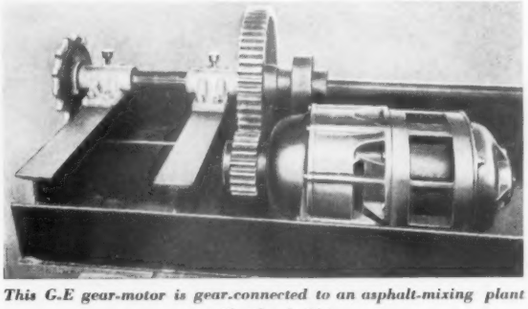


This 133-rpm. gear-motor drives a 2-ton pug-type cold-amesite mixer in a New York rock-products plant

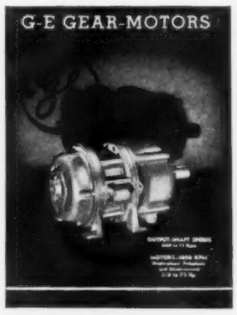
Compact, efficient drives for your low-speed machines

G-E gear-motors will deliver full rated power from the output shaft at the low speed you want. You can connect them directly to your machines, or use simple chain, belt, or gear drives. Thus, you eliminate complicated back gearing or countershafts, save space, reduce installation cost, and cut maintenance.

Gear-motors combine the economies of normal-speed motors with those of accurately cut helical gears running in oil. They are available, in standard a-c. and d-c. voltages, from 1/6 to 75 hp. You'll find them smooth-running, dependable, long-lived—the kind of a drive that will help you save money.



This G-E gear-motor is gear-connected to an asphalt-mixing plant in Cleveland, Ohio



This booklet is full of useful information on G-E gear-motors . . . types and sizes available . . . where to use them . . . installation photographs. Send coupon for your copy

GENERAL ELECTRIC

SEND FOR COMPLETE INFORMATION

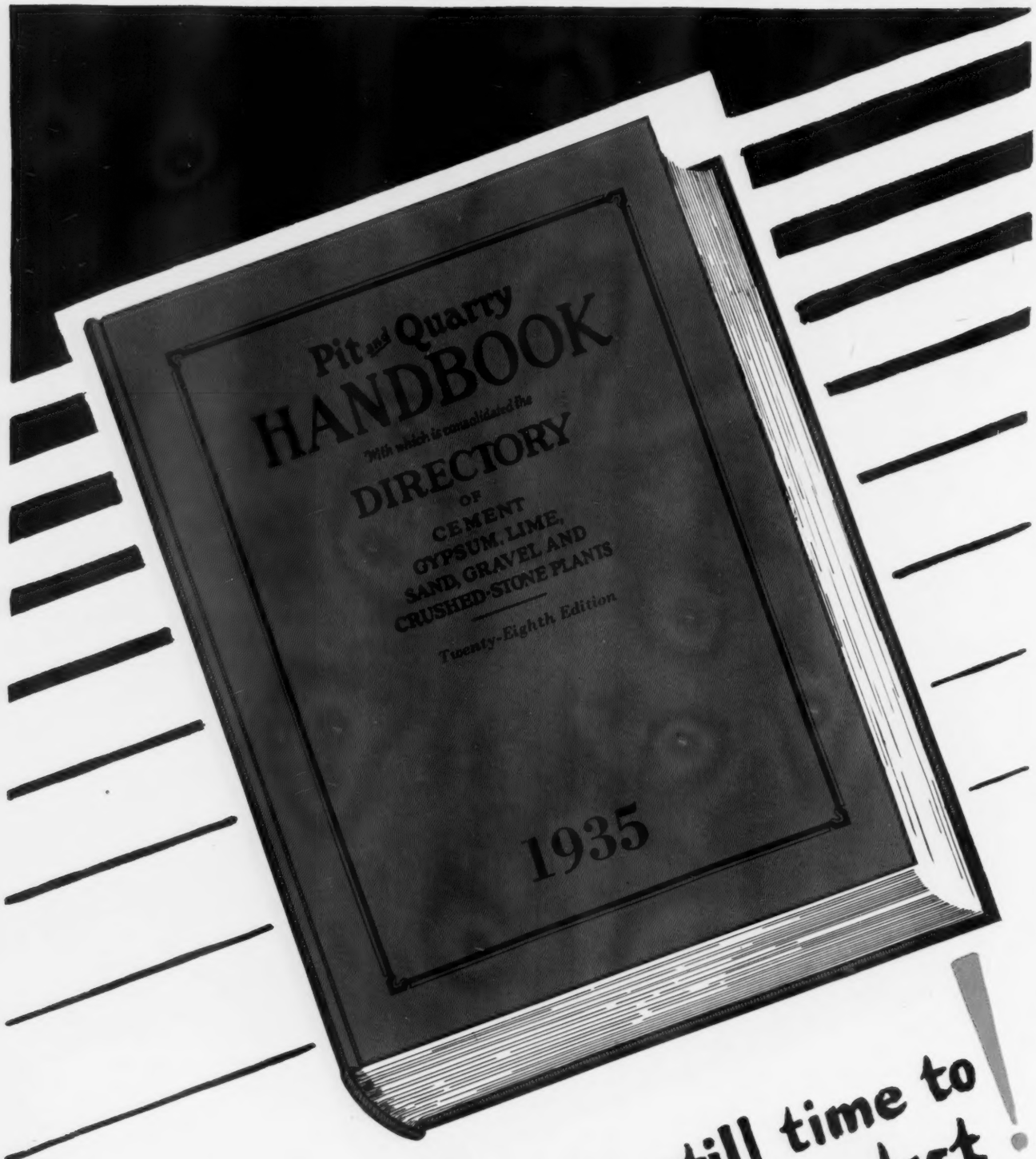
General Electric Company
Dept. 6E -201, Schenectady, N. Y.

Please send me a copy of your handy booklet, G-E GEAR-MOTORS, GEA-1437B.

Name .....

Company .....

Address 020-38



There's still time to catalog your product!

Write for Rates and Reservations

Here's Your MARKET for 1935

Pit and Quarry HANDBOOK offers you 100% sales coverage for all of the coming year—a year that business leaders say will mark a sensational come-back for the heavy industries.

Housing programs, road building, land development projects and government construction on a huge scale, all point to an unprecedented demand for basic materials.

As the one and only Directory of all *producing plants* and *purchasing personnel* in the cement, gypsum, lime, sand, gravel and crushed stone fields, the HANDBOOK is the key to your advertising campaign.

List your entire line in this Buying Manual of the Pit and Quarry Industry—and your sales message will go to every prospect who authorizes or approves purchases in the 4,700 producing plants in the industry.

This is your logical market and your 1935 advertising will not be complete unless you include a page or series of pages in the HANDBOOK to catalog your products.

Act now, before the closing date of publication makes you miss your market.

PIT AND QUARRY PUBLICATIONS

538 SOUTH CLARK ST., CHICAGO

The telfax system of tape marking wire rope is

Williamsport's

protection to the

Pit and Quarry

industry

It's a simple matter to get fooled on Wire Rope—unless the grade of steel is definitely labeled. That is why the Telfax Tape System of marking is really the only real protection from error or possible substitution.

Every foot of Williamsport rope contains a tape throughout the core on which is plainly printed the kind of steel used in its manufacture. No other Wire Rope contains this protection.

Have you tried our new "Form-Set" Wire Rope? It's the newest idea in Preformed wire rope made the Williamsport way of Williamsport quality. If you use Preformed Wire Rope you'll like Williamsport best. Let us tell you why. Our engineering department has been a great help to Wire Rope users. Let them solve your problems.

No obligations.

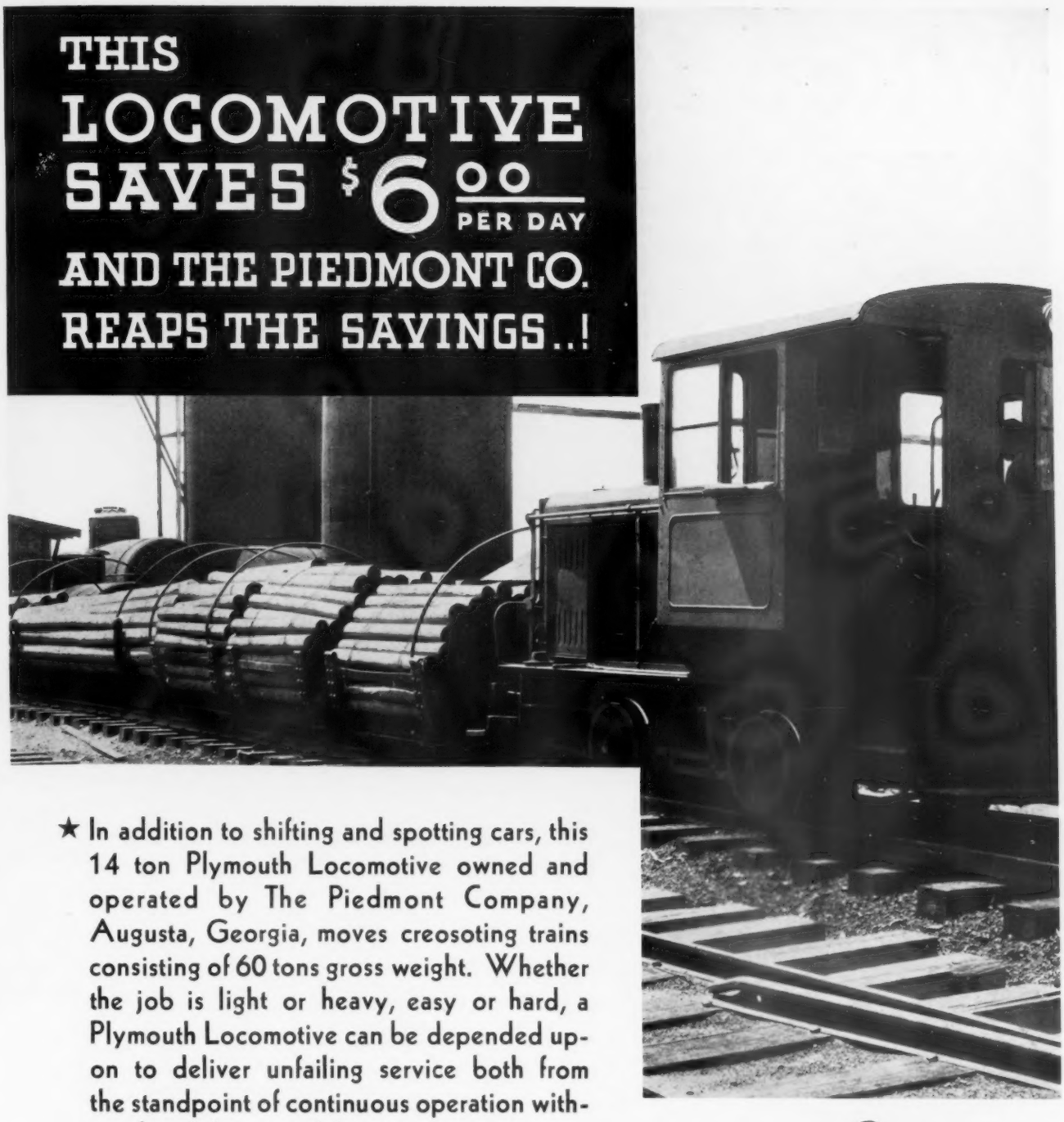
●

WILLIAMSPORT WIRE ROPE COMPANY

Main Office and Works
Williamsport,
Penna.

Branch Sales Office
122 So. Michigan Ave.
Chicago

THIS LOCOMOTIVE SAVES $6.00 PER DAY AND THE PIEDMONT CO. REAPS THE SAVINGS..!



★ In addition to shifting and spotting cars, this 14 ton Plymouth Locomotive owned and operated by The Piedmont Company, Augusta, Georgia, moves creosoting trains consisting of 60 tons gross weight. Whether the job is light or heavy, easy or hard, a Plymouth Locomotive can be depended upon to deliver unfailing service both from the standpoint of continuous operation without breakdown and low cost maintenance. The saving of $6.00 per day estimated by The Piedmont Company roughly figures $1800 per year. Let us send you a copy of the Plymouth Locomotive Bulletin!

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LOCOMOTIVES

PLYMOUTH LOCOMOTIVE WORKS, PLYMOUTH, OHIO, U. S. A.

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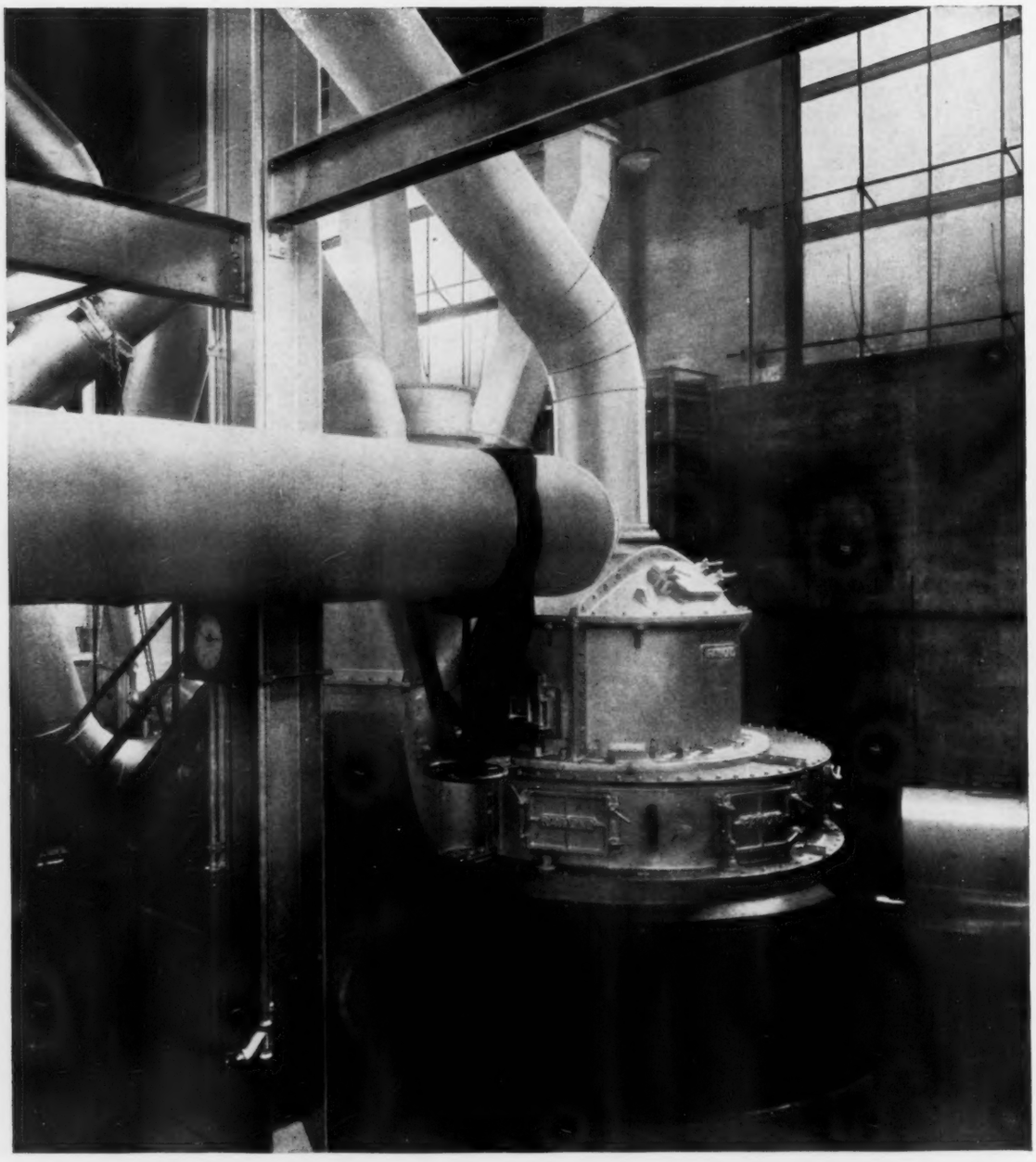

Installation of Raymond No. 15 Super Roller Mill producing 17 tons of powdered coal per hour for the boilers of a big public utility plant.

WHEN your pulverizing requirements call for big tonnages, you can take advantage of the extraordinary economies of the Raymond Super Roller Mill. This giant unit concentrates the whole process in a single machine—automatically feeding, separating, conveying (drying, too, where desired) in one continuous, dustless operation. For any given job, fewer mills mean lower costs, so that you can often substitute a Super Mill for several smaller units with resultant savings in labor, power and upkeep. Built in three sizes, No. 10-15-25, Super Mills are available in capacities of ten to forty tons per hour for grinding limestone, gypsum, phosphate rock, clay, coal and other non-metallic minerals. For details, write for new Catalog.

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VOLUME 27 NUMBER 6

Pit and Quarry

With which is consolidated

CEMENT-MILL & QUARRY

CHICAGO, DECEMBER, 1934

Work on PWA Highways Employs 123,792 Men

7,280 MILES NOW BUILDING

Progress made on emergency construction of public works highways to December 1 under the supervision of the U. S. Bureau of Public Roads shows a total of 484 projects, estimated to cost $25,489,000, approved but contracts not yet awarded; 658 projects, estimated to cost $25,364,000, awarded but not yet under construction; 2,578 projects, estimated to cost $156,599,000, under construction; and 6,837 projects completed at a cost of approximately $295,632,000.

The 2,578 projects under construction involve 7,280 mi. of road and are giving regular direct employment to 123,792 men.

The above figures include projects involving funds provided by the Acts of June 16, 1933, and June 18, 1934.

New Silica Sand Plant in Ottawa, Ill., District

★ The George M. Pendergast Co., Milwaukee, Wis., has completed a new plant at Utica, Ill., for the production of silica sand. The product is to be used in the making of steel castings. The plant has a capacity of 150 tons per hr. and is equipped with Stephens-Adamson conveying and screening machinery.

Standard Traprock Corp. Awarded Huge Damages

The Appellate Division of the New York State courts recently affirmed by a vote of 4 to 1 the award of $2,099,950.00 to the Standard Traprock Corp. and the Sparkill Realty Corp. against the State. The Court of Claims had originally made the award which was held insufficient by the companies and excessive by the state, which made the appeal. The award comprised $1,650,000 for the land, $444,950 plus interest for the developments, and $5,000 for expenses in title research.

The controversy started when, on Oct. 11, 1928, the state appropriated for park purposes 168 acres which had been purchased by the corporations for stone quarrying purposes and on which they claim to have spent $500,000 for a plant and other developments. The plant was completed but never operated.

Justice Daniel V. McNamee wrote a dissenting opinion in which he stated that the value of the property outside of structures was only $120,000 and that the award was 10 times this amount and 20 times the usual price for such stone lands. He said also that it was nearly 40 times the cost of the property to the owners and 80 times its assessed valuation.

Mathieson Alkali Lime Division Being Enlarged

★ The Mathieson Alkali Works, New York, N. Y., has revised its plans for several units of its alkali plant which is nearing completion at Lake Charles, La. These changes include increased capacity in its lime division and the addition of another rotary kiln and other equipment.

Iron City Company Gets Large Material Contract

The Iron City Sand & Gravel Co., Pittsburgh, Pa., according to George Vang, president, has been awarded a contract by the Frederick-Snare Co., contractor of New York, for 2,000,000 tons of sand and gravel to be used in the construction of the Tygart River Reservoir project near Grafton, W. Va. This material will be supplied in conjunction with the Ohio River Sand & Gravel Co., and the Ohio Valley Sand Co. and, it is estimated, will cost $1,500,000.

★ The River Sand & Gravel Co., Owensboro, Ky., has installed a 20-ton truck-scale made by the Independent Scale Co., Evansville, Ind. It is reported that conveying and screening equipment will be installed in the plant.

★ The Huron Portland Cement Co. has installed in its packhouse at Oswego, N. Y., a complete Norblo dust-collecting system made by the Northern Blower Co., Cleveland, O.

Eight Cement Plants Reopened in November

TREND IS CONTRA-SEASONAL

Indications are that the unseasonal demand for cement during the month of October has carried over into November and that the production for that month will be far ahead of the same month in 1933 and little if any less than in October. This is evidenced by the fact that comparatively few plant shutdowns have been announced and a number of plants have resumed operations at a time when they are usually closing for the winter. Plants which have resumed operation during November include: Cumberland Portland Cement Co., Cowan, Tenn.; Alpha Portland Cement Co., LaSalle, Ill.; Universal Atlas Cement Co., Duluth, Minn.; Lone Star Cement Co. Kansas, Bonner Springs, Kans.; Consolidated Cement Corp., Fredonia, Kans.; Lehigh Portland Cement Co., Sandt's Eddy, Pa.; Ash Grove Lime & Portland Cement Co., Chanute, Kans.; Superior Portland Cement Co., Concrete, Wash.

Texas Limestone Products Plant Officially Opened

★ The Limestone Products, Inc., new $15,000.00 limestone mill near Dallas, Texas, was dedicated recently with a program at the main storage warehouse. It has been in operation for some months but the dedication was delayed until the rush season was over. The plant has a capacity of 80 tons of finely ground limestone for each 8-hr. shift and is electrically operated. Truck and rail transportation are available. The product will be known as "Dallas Ground Limestone."

The plant and property of the Lima Stone Co., Lima, O., which has been in bankruptcy for some time, was sold for $38,005.00 to mortgage and bond holders at a receiver's sale Nov. 22. The purchasers are: the First National Bank of Pandora; the National Bank of Bluffton; Ellen Stambaugh; Dan R. and Mable Triplehorn; Gilbert, Claire B., Eliza and Bertha Fett.

Cement Makers Show Optimism at Chicago

LARGEST CROWD IN SIX YEARS

The 32nd Annual Meeting of the Portland Cement Assn., held Nov. 19 to 21 at the Blackstone Hotel, Chicago, attracted the largest attendance of cement company executives since 1928. Two hundred and sixty representatives from 69 companies were registered.

Encouraging reports as to the manner in which cement shipments to dealers are holding up created a more optimistic feeling than has been evident in recent years. An unseasonal autumn pick-up in home modernization and building activity resulting from the National Housing Act was mentioned by some as one reason for the improved showing, together with a greater farm purchasing power.

Showing the same determined spirit evident during the dark days of 1932 and 1933, the delegates voted to continue with an aggressive market promotion and development program through the association to widen and recover the markets for cement. A continuing and enlarged newspaper advertising campaign for the coming year was approved.

The first day of the convention was given over to committee meetings, with all of Tuesday devoted to a program arranged by the Promotion Committee of which S. W. Storey is chairman. The annual business meeting was held on Wednesday.

The work of the industry's front-line shock troops—the association district offices and field engineers—was presented at the morning session of the promotion program. In the afternoon progress reports were given on several research and development projects in which new uses and improved construction methods for concrete are sought. Improved methods of rational concrete pavement design to fit anticipated traffic volume and wheel loads have resulted in lowering the cost of concrete paving for lighter traffic roads and streets, thus reducing the cost differential between concrete and lower-type surfacings.

Research to discover economical, practical ways to incorporate color in architectural concrete is expected to add further to the popularity of monolithic-concrete buildings. In the housing field more economical monolithic-concrete walls and precast-unit construction systems are being sought. Much progress already has been made.

In spite of the low ebb in building construction, more monolithic-concrete buildings are now under construction or on the drafting boards preparatory to construction than at any previous period. As building recovery comes, this market is expected to add materially to cement consumption.

Due to the irregular operation of cement mills and the shifting of employees from one job to another in order to provide maximum employment, the accident record of the industry suffered slightly during the year. However, this problem is being tackled by mill superintendents and executives and an improved record is looked for in the coming months. Several mills are almost sure to enter the no-accident list for the first time during 1934.

During the past year interest in low-heat and sulphate-resistant Portland cements has resulted in submission to Committee C-1 of the A.S.T.M. of a new specification for the latter, now being voted on by letter ballot. This specification, having a lower tricalcium-aluminate content, is believed adequate to serve both as a sulphate-resistant cement and as a cement of moderate heat evolution. The proposed low-heat specification is still before Committee C-1 for consideration.

Tests to determine the resistance of concretes to sea water are under way by the Research Laboratory. Another promising series of tests to determine the effects of high-pressure steam curing of concrete products also has been undertaken.

The directors of the association re-elected Edward J. Mehren president and William M. Kinney as vice-president and secretary. B. F. Affleck, president of the Universal Atlas Cement Co., was reëlected treasurer. The following will serve as directors of the association for terms beginning in 1935:

Charles Boettcher, president, Nebraska Cement Co., Denver; G. S. Brown, president, Alpha Portland Cement Co., Easton, Pa.; C. B. Condon, secretary and general manager, Hawkeye Portland Cement Co., Des Moines, Ia.; Charles L. Hogan, president, International Cement Corp., New York; John J. Porter, president, North American Cement Corp., New York; F. E. Tyler, president, Dewey Portland Cement Co., Kansas City, Mo.; John Treanor, president, Riverside Cement Co., Los Angeles; Joseph S. Young, president, Lehigh Portland Cement Co., Allentown, Pa.; W. A. Davis, vice-president, Standard Portland Cement Co., Cleveland, O.; J. B. John, president, Medusa Portland Cement Co., Cleveland, O.; A. P. Meyer, vice-president, Green Bag Cement Co. of Pennsylvania, Pittsburgh; A. J. Rooney, vice-president, Huron Portland Cement Co., Detroit; S. W. Storey, vice-president, Trinity Portland Cement Co., Dallas, Texas; M. Moss Alexander, president, Missouri Portland Cement Co., St. Louis; M. C. Monday, president, Hermitage Portland Cement Co., Knoxville, Tenn.; Blaine S. Smith, president, Pennsylvania-Dixie Cement Corp., Nazareth, Pa.; R. S. Weaver, president, Allentown Portland Cement Co., Catasauqua, Pa.; Edwin P. Lucas, president, Superior Portland Cement Co., Seattle, Wash.

One of the buildings completed in 1934 in which concrete was used as both the architectural and structural material.

Ohio Concrete Producer Adds New Mixer Trucks

★ The Mixed Concrete Co., 560 Harmon Av., Columbus, O., recently purchased two new Jaeger mixing trucks, each having a 2½-cu.yd. capacity. The company now has a fleet of six Jaeger mixing trucks in connection with its modern centralized mixing plant, and with this equipment it is able to supply ready-mixed concrete to construction jobs throughout the winter regardless of the weather, C. E. Haines, manager of the company, states.

Cement Companies Get Awards for Fort Peck

The Three Forks Portland Cement Co., Denver, Colo., has been awarded a $559,750 contract by the War Department for furnishing cement for construction of the Fort Peck Dam project in Montana. The Universal Atlas Cement Co., Chicago, Ill., was also awarded a cement contract for $373,560.

Eastern Talc Producer Denied Code Exemption

The Seaboard Operating Co., Baltimore, Md., has been denied, by N. R. A. Administrative Order 9, exemption from the provisions of Article IV, Sec. 1 (minimum wages) of the talc-and-soapstone industry's code (No. 350).

★ The Providence Transit Concrete Co., Providence, R. I., recently installed in its ready-mixed concrete plant a set of Bin-Dicators. These devices, which indicate the level of material in bins, are made by the Ripley Mfg. Co., Wayne, Mich.

Motor-Tax Diversion Is $200,000,000 Yearly

ROAD-BUILDING PLANS SUFFER

Return to state road building funds of gasoline tax and motor vehicles license fees, now being diverted to emergency relief and other purposes, will be sought by the American Road Builders' Association during its 32nd Annual Convention and Highway Exhibit in Washington, D. C., January 22 to 25, inclusive.

Highway officials declare that various states are now diverting about $200,000,000 a year from gasoline tax and motor vehicle license fees to other uses, and if this program is continued, road improvements will be jeopardized and ultimately these states will be unable to participate in Federal appropriations for highways.

The general theme of the Convention will be: Continuation of an adequate highway program; use of highway revenue for highway purposes only; and continuation of Federal appropriations for highways.

The Convention will draw to Washington approximately 5,000 of the country's outstanding highway officials, engineers, contractors and manufacturers. One of the features will be an exhibit of the latest developments in equipment and materials. More than 100 exhibits are expected to be on display.

Two general sessions of the Convention will deal with subjects of vital interest to the highway industry. In addition there will be meetings of the County Officials' Division, City Officials' Division, Highway Contractors' Division, and Engineers' and Officials' Division for consideration of problems directly applicable to these groups.

Aside from the general and divisional sessions, there also will be several committee meetings, and a social program that includes a Pan-American Reception, and a gala banquet that will bring the Convention to a close.

Capt. H. C. Whitehurst, President of the Association and Director of Highways for the District of Columbia, points out that the coming Convention will be of special importance because the theme will include the foundation of the activities of the future highway program based upon the economics of the highway situation in the country at the present time, and further because the highway construction program is playing such an important part in the national recovery program.

Date is Set for Oregon Permissive Area Hearing

Pursuant to the provisions of the Code of Fair Competition for the crushed-stone, sand-and-gravel, and slag industry, Article VII, Sec. 5, the State Committee of Oregon, in making its survey relative to the fullest possible utilization of the present productive capacity of the industry, feels it advisable that a "permissive" area be formed in the Portland metropolitan area. December 17, 1934, at 10 a. m., has been set for the hearing, which will take place in the office of the State Committee, 43 S. E. Salmon St., Portland, Ore. All who may be interested are invited to be present at that time.

The members of the State Committee are: Stationary Plants: Porter W. Yett (chairman), Fred S. Anunsen, and D. L. Carpenter; Portable Plants: Arthur Milne, A. H. Saxton, and Marshall Newport; Seventh Member: Roscoe C. Nelson.

Lime Price Deviations Cause Many Complaints

During the first year of operation under its N. R. A. code the lime industry's code authority received only 23 formal complaints of alleged code violations. Of these, 2 were rejected and 21 accepted. Of the 5 complaints withdrawn, one was reinstated, leaving 17 for investigation and action. In 4 cases no violation was found, 4 others were adjusted without formal action, 4 were pending in the hands of the Code Authority or the National Trade Practice Complaints Committee, and 5 were referred to the N. R. A. One of these was withdrawn, in 2 cases the defendants were found guilty by the Compliance Council, and in 2 others the complaints were adjusted, there were restitutions of back wages and certificates of compliance were signed.

A majority of the complaints alleged violation of Article III, Sec. 3 (c) by deviations from filed prices. Several complaints charged violation of the labor provisions covering maximum hours and minimum wages. Alleged violations of Article IV, Unfair Methods of Competition, pertained to selling below cost, inducing breach of contract, consigned goods, protected contracts, duration of agreements, and splitting of commissions.

In addition to the complaints brought under the lime code against lime manufacturers, the Lime Code Authority has been instrumental in having an investigation made of a manufacturer of a product competitive with lime who was under no code but who had signed the President's Reëmployment Agreement. This manufacturer was selling his product at a very low price and investigation showed that he was violating the terms of the P. R. A. A heavy restitution of the back wages has been required by the N. R. A.

★ The East Peoria Sand & Gravel Co., East Peoria, Ill., has installed a 2 by 3 ft. Simplicity double-deck screen and an 18-ton Howe truck-scale.

Housing Department Explains Operations

USES MORTGAGE ASSOCIATIONS

The Federal Housing Administration has made public the plan of operations under Titles II and III of the National Housing Act, dealing with residential mortgage financing. These titles provide the legal basis for the long-range program of the Federal Housing Administration as distinguished from the Modernization and Improvement Program which, under Title I, has been going on since August 10, and which will terminate by statutory limitation at the end of 1935 unless extended by Congress.

The program provides an opportunity to owners of dwellings to refinance their mortgages, and to prospective owners to obtain financing on terms comparable to the payment of rent.

Mutual insurance of mortgages on existing or new dwellings in amounts up to 80 per cent. of appraised value, for as much as $16,000, for periods up to twenty years, and with the privilege of payment by regular periodic installments is provided for.

Provision is made for the establishment of National Mortgage Associations, each with a paid-up capital stock of at least $5,000,000, privately subscribed, whose business it will be to purchase insured mortgages and issue debentures against them for sale to the public.

It was explained that mortgage loans will not be made by the Federal Housing Administration itself but by the various existing institutions designated as approved mortgagees. This classification includes, among others, national and state banks and trust companies mutual savings banks, mutual building and loan associations, life insurance companies and other such institutional investors; and, subject to certain qualifications, such institutions as are otherwise eligible as members of the Home Owners' Loan Bank and the Federal Deposit Insurance Corp.

Coal Replaces Gas Fuel at Dewey Buffalo Plant

The Dewey Portland Cement Co. has changed its plant at Buffalo, Ia., from gas-burning equipment to coal-burning, according to officials of the Southern Illinois Reciprocal Trade Assn., and has awarded a contract for 80,000 tons of southern Illinois coal.

★ The Spokane Portland Cement Co., Spokane, Wash., has purchased a Schaffer Poidometer to be used for weighing and feeding materials to a new Babcock and Wilcox grinding mill.

The France Slag Co., Toledo, O., is reported to have purchased the Cashion Slag Co., with plants at Donora and Scottdale, Pa.

Public Roads Bureau Does Big Year's Work

14,780 MILES OF ROAD BUILT

The road construction supervised by the Bureau of Public Roads in the fiscal year ended June 30, 1934, far exceeded the construction in any previous year, according to Thomas H. MacDonald, chief of that bureau of the U. S. Department of Agriculture.

"This increase was due primarily to grants for road construction under the National Industrial Recovery Act," says Mr. MacDonald. "The roads built have been sections of the Federal-aid highway system, extensions of the system into and through cities, important secondary or feeder roads, and sections of main highway through the national forests, parks, and public lands."

The peak in employment with 336,414 at work on Federal and Federal-aid highway construction came in June, 1934, when the new public-works program was well advanced, according to the report. This figure represents direct employment on the roads only and does not include the indirect employment, conservatively estimated at 1.4 times the direct, provided in the production and transportation of materials and equipment used in road construction.

The report shows that Federal and Federal-aid construction employment supervised by the Bureau of Public Roads has constituted an increasing proportion of Federal and state highway employment. Federal work was a fourth of the program in 1932 and nearly one-half in 1934. Under the Federal road program conditions were imposed which had the effect of increasing the man labor per unit of expenditures and of distributing the benefits in approximate relation to employment needs. Opportunities to work on the highways built across cities were offered to the unemployed in cities and in country regions local labor was given direct employment. In 86 per cent. of the counties in the United States some highway employment was provided with National Industrial Recovery Act funds. In several states some highway work was provided in all the counties.

The larger classes of work supervised by the Bureau of Public Roads were the construction provided for by the National Industrial Recovery Act and that provided by the unexpended balances of Federal-aid appropriations. Other classes of work, smaller and more restricted but locally important, were the improvement of national forest highways, national park highways, and highways through public lands. Two other classes of work which were outgrowths of the recovery legislation were the work-relief highway projects to provide quick and specialized relief in sections where unemployment was particularly acute, and the loan-and-grant projects which, after approval by the Public Works Administration, were placed by that body under the supervision of the Bureau of Public Roads.

Federal-aid funds paid to states during the fiscal year 1934 amounted to $42,291,937 and emergency-construction funds similarly paid amounted to $55,669,145, being unexpended balances due. Public-works-highway fund assigned to the various states amounted to $394,000,000.

A total of 14,780 mi. of Federal-aid roads was completed in the year, bringing the total mileage completed since 1916 to 119,712, more than half of the Federal-aid system designated. The active public-works-highway program for the fiscal year 1934 totaled 22,378 mi. By the end of June 6,986 mi. were completed, 13,674 mi. were in various stages of construction, and 1,718 mi. were approved for construction.

The report states that traffic hazards have been eliminated by the separation of railroad and highway grades at crossings, by the relocation of highways, through widening existing surfaces, easing of curves and grades, the lengthening of sight distances, and other marked betterments. Roadside improvement has been required with at least 0.5 per cent. of each state's apportionment of public-works funds, amounting to a minimum of nearly $2,000,000 for pioneer work toward the ultimate elimination of unsightly roadside conditions. Other major objectives of the program of the year—subject always to the primary employment purposes—include the closing of remaining unimproved gaps in the Federal-aid highway system, and the provision of road facilities to aid in the better coördination of transportation.

Improvements were constructed on 938 mi. of forest highways bringing the total mileage improved to date with Federal funds administered by the Bureau of Public Roads to 5,868 mi. Work was in progress at the end of the fiscal year 1934 on 1,089 mi.

In the national parks the Bureau built for the Interior Department 157 mi. of roads during the year, making a total of 831 mi. thus far improved. The work of the Bureau in park road construction for the National Park Service has been greatly expanded. Practically all the money appropriated for the construction of roads on Federal public lands other than forests was obligated during the year to various projects in the states containing these lands.

Research in traffic problems, in highway-management economics, and in materials of construction has progressed during the year. The report describes traffic surveys made or under way in Indiana, New Jersey, Florida, Connecticut, and Arkansas, and other studies made on safety, taxation, and traffic capacity. Highway accounting methods, costs of work on relief projects, and studies in concrete mixtures were included in management studies. Bituminous materials, subgrades, and other elements of the materials entering into road building were among the subjects for research investigation.

Permissive Areas Set Up in Ohio by N. R. A.

EXPIRE IN JUNE OF NEXT YEAR

Effective November 29, the N. R. A. established seven so-called "permissive" areas in Ohio under the crushed stone, sand-and-gravel, and slag industries code (No. 109), in which no new sand-and-gravel or crushed-stone capacity may be established until June 15, 1935, except by permission of the State Committee.

The order restricts new sand-and-gravel capacity in some of the areas and new crushed-stone installations in others, unless good cause to the contrary is shown before the effective date.

The areas designated are as follows:

Area No. 1: Hamilton and Cleremont Counties.—Area No. 2: Preble County.—Area No. 3: Warren County.—Area No. 4: Fayette, Highland and Clinton Counties and part of Ross and Greene Counties.—Area No. 6: Scioto County.—Area No. 7: the eastern portion of Ross County.—Area No. 9: Auglaize, Allen and Mercer Counties.

The restriction applies only to crushed-stone capacity in Cleremont, Fayette and Allen Counties, and only to sand-and-gravel capacity in Hamilton, Warren and Scioto Counties and Area No. 7.

All applications for new capacity made to the State Committee must be reported to the National Industrial Recovery Board, whether the applications are granted or not. The committee is also required to furnish before April 1, 1935, current statistics of average selling prices, hourly wages for common labor, man-hours employed and tons produced, and the same information for 1933 and 1934.

Established Producers Get Fort Peck Contracts

The J. L. Shiely Co. of St. Paul, Minn., has the contract for furnishing material to be used in tunnel construction at the Fort Peck Dam, involving 88,000 cu.yd. of aggregate and 83,000 tons of sand. They also have a number of other contracts for gravel and sand included in the project. The Becker County Sand & Gravel Co. and J. L. Shiely Co. have contracted to furnish 1,750,000 cu.yd. of gravel for the toes of the dam.

The blacksmith shop of the Ohio Sand & Gravel Co., Front & Baymiller Sts., Cincinnati, Ohio, was destroyed by fire on November 20. Damage was estimated at $1,500.

★ The Kinsman Sand & Gravel Co., Kinsman, O., which has made a number of recent improvements to its plant, has installed a new crusher to take care of the increasing demand for crushed material.

Concrete Trucks Not Under Trucking Code

COVERS ONLY FOR-HIRE TRUCKS

Administrative Order No. 278-19 of the N. R. A. provides: ". . . that the fee provided to be charged under the Code of Fair Competition for the Trucking Industry, for registering vehicles 'not for hire,' falling under Article II, (B) (1), as amended by the Order of March 26, 1934, be and the same is hereby suspended, and that registration and reporting required under the code with respect to such vehicles be stayed, pending further order by me, respecting the securing of essential reports with respect to such vehicles and their operations, from the Code Authority of codes controlling such transportation, or the securing of essential reports in such other manner as may be found practical. . . ."

An agency of the Code Authority for the Trucking Industry has expressed the opinion that trucks of premixed-concrete manufacturers come within the "for hire" definition contained in that code, and has asked them to register their trucks with that agency under it. Since it is the usual condition that premixed-concrete trucks are owned and operated by the concrete manufacturers for delivering the product of their own manufacture, a letter was recently addressed to the Administration, requesting that the Concrete Code Authority be informed as to whether or not concrete maker's own trucks are to be classed under the "for hire" provisions of the trucking code. K. A. McRae, Acting Assistant Deputy Administrator, Transportation Section, Public Utilities Division, of the N. R. A., has replied, saying: "If the truck . . . are owned and operated by members of your industry and are not offered for hire, their operation would not be subject to the provisions of the trucking code. If, however, these trucks are offered 'for hire' or are rented from a 'for hire' operator, they would be subject to all the provisions of the trucking code."

Gas Locomotive Bought by Ohio Lime Producer

★An 8-ton gasoline locomotive has been installed by National Mortar & Supply Co. at its Gibsonburg, Ohio, plant, of which F. J. Wertel is superintendent. The locomotive is a Plymouth furnished by the Fate-Root-Heath Co. of Plymouth, Ohio.

TVA Lets Contracts for Pickwick Dam Cement

The Tennessee Valley Authority has awarded contracts for 750,000 bbl. of cement to be used in the construction of the Pickwick Landing dam which is one of the major TVA projects. A large part of the order went to the Volunteer Portland Cement Co., Knoxville, Tenn., which as a result plans to add to its employees and possibly to enlarge its plant in the spring, according to Charles F. Lewis, manager. Other plants participating in the order are: The Pennsylvania-Dixie Cement Corp., Richard City, Tenn.; Cumberland Portland Cement Co., Cowan, Tenn.; Hermitage Portland Cement Co., Nashville, Tenn.; Marquette Cement Mfg. Co., Cape Girardeau, Mo.; and the Alpha, Lehigh, Lone Star and Universal Atlas plants near Birmingham, Ala. Construction of the Hiwassee, Aurora and French Broad projects has also been authorized.

PWA Spends $128,613,023 for Nonmetallic Minerals

Owing to a change in the government's method of collecting the information it is now possible to report in detail, according to type of material, the total P. W. A. funds spent monthly for nonmetallic minerals and their products for both highway and other-than-highway projects. Until recently it was necessary to estimate the share of P. W. A. road-project money spent for minerals.

In the eleven months ended August 15 a total of $128,613,023 was expended for nonmetallic minerals and their products. The accompanying table shows the individual amount for each type of material spent in August, in the ten preceding months and the totals for the eleven months. For cement $54,465,005 was spent in that time, for sand and gravel $29,505,047, and for crushed stone $17,374,394, a total of $101,344,446 for those three materials. The August expenditures for these materials totaled $10,415,895.

NONMETALLIC MINERALS AND THEIR PRODUCTS PURCHASED FOR PUBLIC-WORKS PROJECTS IN 1933 AND 1934

Material	Month Ended Aug. 15, 1934	Previous Total (10 months) to July 15, 1934	Total (11 months) from Beginning to Aug. 15, 1934
Cement	$5,402,351	$49,062,654	$54,465,005
Sand and gravel	3,197,754	26,307,293	29,505,047
Crushed stone	1,815,790	15,558,604	17,374,394
Marble, granite, slate and other stone products	584,769	5,542,297	6,127,066
Lime	17,821	78,967	96,788
Clay products	852,703	3,709,642	4,562,345
Concrete products	1,371,479	5,035,379	6,406,858
Glass	38,434	249,329	287,763
Paving materials and mixtures	950,368	6,741,192	7,691,560
Roofing, asphalt shingles, etc	182,551	986,023	1,168,574
Wall plaster, wall board, etc	125,017	671,535	796,552
Asbestos	8,450	42,292	50,742
Minerals and earth	7,897	72,482	80,379
	$14,555,384	$114,057,689	$128,613,023

The J. E. Baker Co., York, Pa., is reported to be planning the erection of a new crushed-stone plant at Bluemont, Md. Authority has also been granted the company to produce Dry Ice at Martinsburg, W. Va.

Public Not Entitled to Government Prices

NRA CLARIFIES ORDER 6767

Question has arisen within the ready-mixed-concrete industry as to the meaning of certain parts of Executive Order 6767, which permits, under certain conditions, the quoting of as much as 15 per cent. under filed prices when offering materials for sale to governmental agencies, state, county, municipal or other public authority.

Walter G. Hooke, Deputy Administrator, has said in reply to questions: "The intent of the Executive Order No. 6767 seems to be perfectly plain, namely, that the price quoted to a government agency is to apply to the specific job. Because copies of such bids are filed with the proper industry agency as information they do not, therefore, become new prices for quotation to the general public. Furthermore, as the order specifically refers to a bid to any governmental agency and to goods or services, prices for which must have been filed prior to their quotation with the proper authority, the implication is that these prices must have been filed by a member of the industry. In this case a third party could not receive the benefit of the lower price, *nor would he be able to quote such a lower price.* He is neither a governmental agency nor a member of the industry. This would not prevent a *bona fide* agent of a member of the industry from quoting reduced prices within the tolerance allowed, provided such quotation was made on the responsibility of the member of the industry, the third party in such a case merely acting as an agent for the more expeditious transaction of business."

It is evident, therefore, that making use of the permitted tolerance of 15 per cent., or any portion thereof, when quoting to a public authority, in no way affects a producer's filed prices and that such tolerance may not be employed in selling, except when the sale is made direct to the public authority. Furthermore, any producer who has filed his price and who sells his product to a contractor or other intermediary, to be used on projects of such public authority, at less than his filed price, is guilty of violating the code.

Three hundred employees of a cement factory at Hidalgo, state of Nuevo Leon, Mexico, took possession of the plant and informed the state and federal governments of their action, contending that it was necessary as the closure of the factory threatened their families with starvation. Both Cementos Mexicanos, S.A., and "La Tolteca" Cia. de Cemento Portland, S.A., operate plants in Hidalgo, but which company's plant was involved could not be learned.

Editorials

The Need for Public Works

RUMORS concerning requests for additional public-works funds which will be laid before the next Congress center around sums of $10,000,000,000 to $12,000,000,000 as representing the probable combined demands of Secretary of the Interior Ickes and Federal Emergency Relief Administrator Hopkins. In Democratic circles these figures, if they are seriously considered at all, probably represent a wish rather than an expectation, and among Republicans they are seized upon as evidence of the extreme lengths to which the present government has gone in its efforts to create social equilibrium.

With well-considered estimates of present unemployment ranging between 14,000,000 and 16,000,000 persons it is evident that the problem of relieving those who are living in conditions of distress and actual want is still enormous. The task of supporting such large numbers of people in a state of enforced idleness has already made great inroads on the country's potential wealth as expressible in terms of labor power, and any continuation of that policy will only add to the heavy burdens now being borne by those who are employed. The economic transference of wealth from the hands of those who have to the hands of those who have not is being accomplished just as surely as if such a goal had been planned by confiscatory taxation. Whatever social wrong may be in process of perpetration through present means is being increased by the lamentable fact that most of those receiving support from their more fortunate fellow citizens are contributing nothing to the material betterment of their social environment; they draw their sustenance, however meager, from the fount of public wealth, yet they do nothing—and, admittedly, this arises from no lack of desire on the part of most of them—either to replenish the dwindling supply or to create new wealth.

The greatest crime against humanity involved in the World War, aside from the terrific loss of life, was the social waste incurred by the loss of incalculable billions of man-hours of labor devoted to the destruction of wealth and to the manufacture of articles designed to destroy wealth. The present waste of potential labor power through unutilized human work capacity is second only to that. Millions of men, willing if not eager to work, are compelled, by the necessities of a situation which they have no peaceable means of correcting, to allow day after day of potential productivity to pass unused, simply because the ordinary outlets for their labor are stopped and their work capacity has no present market value. There is no method by which their wasted hours can be recovered, no way by which their ability to perform useful work can be increased in the future to compensate for the losses of the past, there is not even a trick of logic by which we can deceive ourselves into believing that this wanton waste has been anything but a total loss. From the humanitarian point of view this realization is sufficiently shocking, but from the socio-economic point of view it is an unanswerable condemnation of our indifference to social problems and our inability to interpret our own best interests rightly.

Business has shown no disposition to adjust the inequalities or to correct the errors of this situation, nor is it to be assumed lightly that it has the power to do so even if it possessed the wish. Under even the best conditions—that is to say, in the situation most favorable to the realization of business profits—business men are no better organized, no better equipped mentally, no more accustomed by habit, to consider or to solve this problem than the average of men. There is, therefore, no justice in criticizing them if now, under the pressure of great difficulties and at a time when public thinking is at a low level, they sit back helplessly instead of proposing solutions. Here and there are business concerns with the means to increase employment, even perhaps up to the maximum of "prosperity" levels, by drawing on their reserves, but it is difficult to justify such action unless a public, able to buy, stands ready to absorb their products. Unless action of this kind should become general, such a market would not exist.

In the absence of a general movement of that type—in the absence, it might with equal truth be said, of a general recognition of the need for raising mass-consumption levels as a prerequisite to stimulating mass production—the government has assumed the responsibility for meeting the situation, but in doing so it has realized, quite as clearly as any of us individually, the futility of attempting to restore business by the palliative of feeding the hungry. In the adoption of the original public-works program, and in the repeated warnings of Secretary Ickes who has been accountable for its administration, the government has shown its understanding of the needs and of the practical remedies.

IN our opinion, the public-works program needs no extended defense. As a means for making some of our huge potential work capacity available for the creation of public wealth, it has been the only sound and measurably successful plan open to the nation. As a means for reducing unemployment, it has been the only effective scheme for improving the consuming power of large masses of people. The latter need is a product of the period of economic readjustment through which we have been passing; the former is a normal need which is always present.

On this phase of the subject Secretary Ickes has said: "The financing of public works is important. I confess my impatience with the argument that this nation can not afford useful public works, when the man power required to build these works would otherwise be wasted and unused. Public works which are useful give to the community something of enduring value, whether or not technically self-liquidating. In so far as these works do not pay their way out of income or out of future savings which they make possible, they must be paid for out of taxes. The expenditures for public works are equitably distributed among those who build those works and the taxes are equitably assessed against those who share in our national wealth."

And, to the complaint that we can not afford to pay present taxes, to say nothing of greater future taxes, Mr. Ickes replies: "If economic activity dwindles, it becomes harder to pay taxes on our reduced income, even though the rates are reduced. On the other hand, if business improves, it is easier to pay taxes on our increased income, even if rates are raised. Work, not unemployment, creates wealth. It is the fashion for a certain group of pseudo-economists to dispose of public works with the glib remark that a nation, like an individual, must live within its income. But except for those who inherit wealth or acquire it from fortuitous speculations, an individual who does not work has no income; and, by the self-same reasoning, a nation that does not work can have no income."

WE believe in the social value of public works under all conditions. We believe in the absolute necessity under present conditions for improving mass consuming power before we can expect to increase mass production, and this makes us favor any sound means of increasing employment, which is the foundation, not only of wealth creation but also of wealth consumption. We believe, too, that even if the building of public works were not justified on any of these grounds, it could easily justify itself as a plan vastly more to be desired than any scheme of direct relief unaccompanied by some form of compensatory labor effort. Productive work of any kind is, in our opinion, preferable to the demoralization which is bound to follow the continuance of a policy of supporting large sections of the population in enforced idleness. This nation can not afford to allow millions of able-bodied men to grow lazy, discontented and older—and for these reasons gradually less able to support themselves and their dependents—by quibbling over the "political consequences" of a strong public-works policy. We commit ourselves unreservedly to belief in the necessity for the continuation, on an even greater scale than in the past, of a soundly-conceived and wisely-administered plan of public employment on works of public benefit, and it is our hope that the next Congress will not be unmindful of this continuing need for constructive social and economic planning. Our industries will serve the public interest, as well as their own interest, best by advocating expansion of the government's public-works activities.

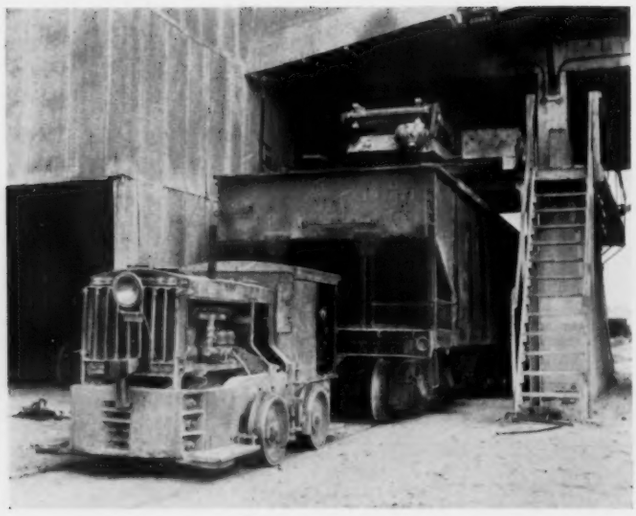
The November Election

AN interval such as has passed since the nation-wide elections of last month is necessary to the attainment of an objective point of view. Unfortunately, most of our newspapers, anxious to outwit one another in the promptness with which they could present their comments and fearful too, perhaps, that reflection might dissipate some of the warmth of their first reactions, flooded the country with their "unimpeachable alibis" and "grand apologies". In some cases the shock was so great that several days were needed to bring editorial writers to the required state of "judicial poise"; in others the passage of a week given over to reflection brought forth some interesting reversals of judgment, recklessly labeled "second thoughts on the election".

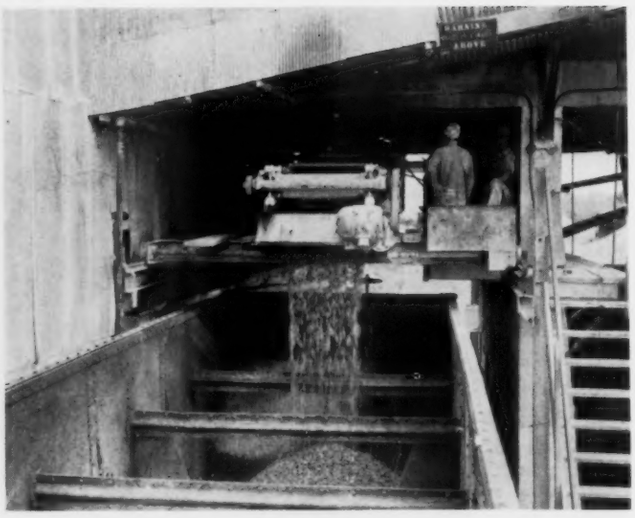
There is no need to attempt a summarization of the various viewpoints presented, except to say that they ran true to form, the Democratic organs calling the result a "mandate to carry on with the 'new deal' ", the Republican writers terming it the exultant war-cry of the hordes on public relief. As examples of wishful thinking, editorial comments on the election have unfolded undreamed-of possibilities in the art of self-deception. They have intensified our mistrust of the press as qualified molders, whether real or make-believe, of public opinion.

The results of the election, it seems to us, must be interpreted in terms of public opinion with reference to social and economic questions. Approached in this manner, it would appear that the Republican candidates failed because they lagged behind public opinion and that the Democrats won because they were in closer harmony with it. Most of us have been too prone to believe that the ideas called "radical" emanate from very small groups, that they make no appeal to good sense, and that they win believers only among the young and unintelligent. The truth is that these ideas have been the property of humanity for centuries, that their vogue has increased with the spread of education and the removal of the old shackles on the free expression of intelligent opinion, and that as the knowledge of facts has increased it has become increasingly difficult to conceal, distort and misrepresent realities.

Political parties nearly always follow the trend of public opinion; seldom do they lead it. In the electioneering of this year, as in that of 1932, the Republicans were sadly out of touch with realities; the progress of public opinion had left them too far behind to make their pleas for public support effective. If they would capture some of the many public offices to be filled in 1936, they will be forced to offer something more vitally interesting, something more satisfying to the skeptical seeking for truth, than the political platitudes of the late nineteenth century. This will mean the abandonment of much of the old-time conservatism and the adoption of policies more nearly attuned to the intelligent thought of the age.



Gasoline locomotive "spotting" car under washing screen for loading from bins.



Traveling washing screen discharging stone into cars. Note small amount of headroom available.

Vibrating Screen Solves Crushed-Stone Producer's Rewashing Problem

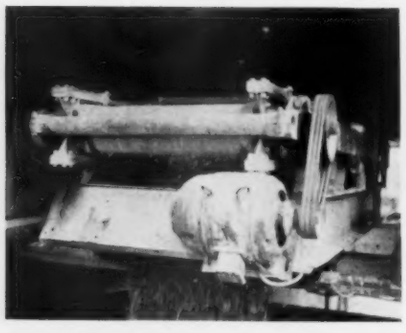
Mounting on Traveling Framework Enables Unit to Serve Four Bins

AN Ohio crushed-stone company was recently faced with the problem of rewashing the finished stone in its bins before loading it into railroad cars for shipment due to the dust created in the handling and storage of the material. Owing to the limited amount of headroom under the bins the use of an ordinary inclined vibrating screen was out of the question and stationary screens were not considered efficient enough. After considerable study the company early in May, 1934, installed a new Symons vibrating screen mounted on a traveling framework so that it could be used under any one of the four bins. Because the screen lies flat it was possible to use two decks to insure efficient washing.

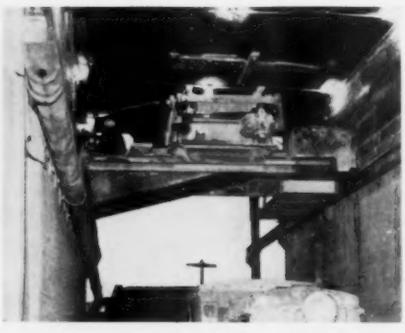
The screen is a 42-in. by 8-ft. double-deck unit with 7/16-in. cloth on the top deck and 5/64-in. on the bottom. Stone is discharged from the bin gates into a feed hopper which is attached to the side bars of the screen and vibrates with them. This provides an automatic feed and spreads the material evenly over the entire width of the deck. The coarse-mesh top deck absorbs any shock caused by the stone feed and keeps the coarser stone off the fine-mesh bottom deck. Wash-water is applied through a box having ½-in. perforations and a perforated pipe which is at the feed end and sprays at the feed hopper and helps feed the stone to the screen. This spray also prevents the packing of "fines" in the hopper. Water connections at each bin gate can be joined to a flexible hose on the screen with little delay when shifting the position of the screen. The machine easily washes 100 tons of stone per hr.

The screen is operated through a Manhattan Con-

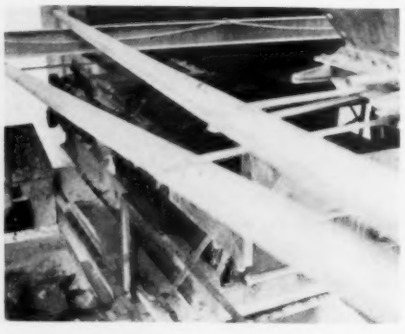
(Continued on page 36)



Operating view of screen with motor and drive in foreground.



Another view of screen showing waste-water flume at left.



Screen viewed from above, showing arrangement of springs on frame.

General view of T. L. Herbert & Sons' property from river bridge. Dredge and material barges are in foreground. Concrete-mixing plant is at left. The new sand-and-gravel concentrator buildings are in center.

Producer of River Gravel Discovers New Use for Concentrating Tables

Impurities Taken Out by Equipment Found Successful in Cleaning Sand

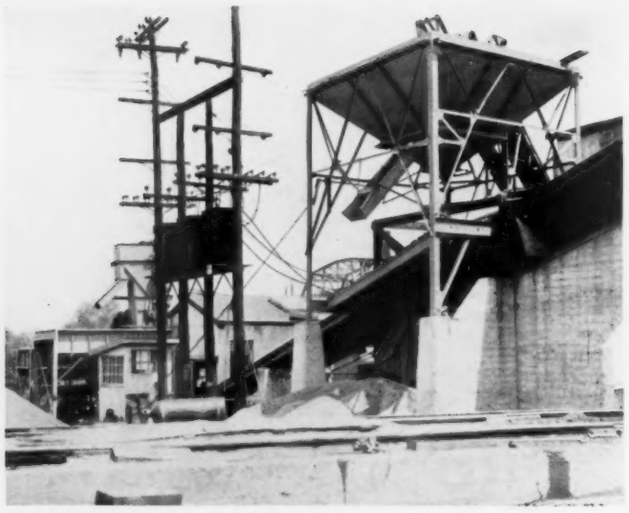
By W. E. TRAUFFER

THE progressive policy of the firm of T. L. Herbert and Sons, Nashville, Tenn., and its willingness to adopt new and improved methods in order to improve its products and lower production costs has received considerable well-deserved publicity. The latest step in its betterment program was taken in May, 1934, when concentrating tables to clean the gravel produced were installed. This followed the installation about a year earlier of concentrating tables for washing and classifying sand. Both these installations are said to be the first of their kind in the commercial sand-and-gravel industry. The material fed to them is dredged from Cumberland River and is extremely dirty, containing organic matter, coal, coke, and other *débris* usually found in large rivers, particularly below sewer discharges.

The Herbert company was among the pioneers in the building-materials and supplies business in Nashville and has complete facilities for furnishing any materials desired for construction work. The products of the company, in addition to sand and gravel, are premixed concrete, asphalt, face and common brick, and hollow tile. Cement and all kinds of other building materials are handled and the company also contracts for roofing and tinning. T. L. Herbert entered the business of producing sand and gravel in 1912 and in 1919 built the present gravel plant, to which many improvements have since been made. In 1931 the asphalt and premixed-concrete plants were built. A complete description of the gravel and concrete operations was published in the July 27, 1932, issue of PIT AND QUARRY.

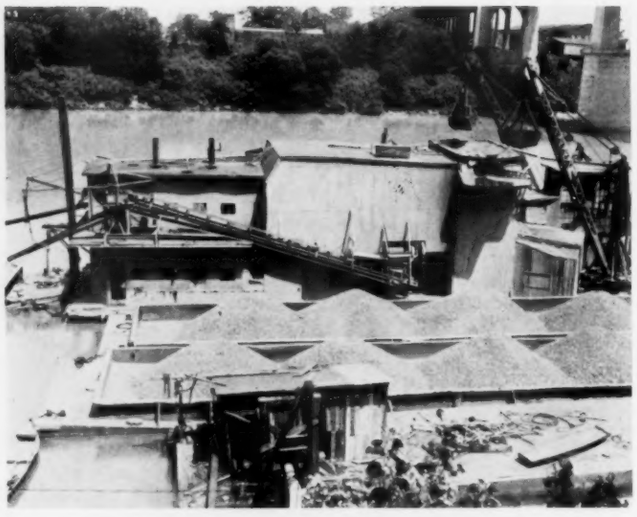
Previous to the installation of the sand tables some difficulty was experienced in producing a clean sand, but now the product uniformly shows a No.

The 1¼-cu.yd. steam locomotive crane used for handling materials to and from stock-piles.



Incline to storage-bins with gravel elevator and hopper at left and sand conveyor and hopper at right.

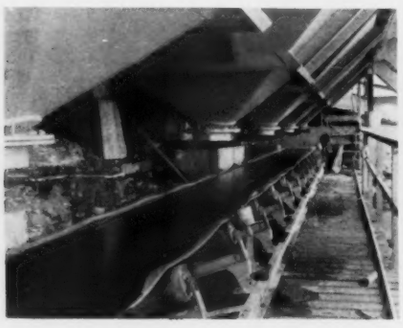
2 colorimetric plate and in both purity and strength far exceeds state highway specifications. Tests of briquettes made with this sand have shown strengths 8 to 20 per cent. higher than briquettes made with standard Ottawa sand. A uniformly-clean material is being produced regardless of the percentage of impurities in the sand and gravel fed to the plant. The company advertises its product as a specially-processed sand and gravel.



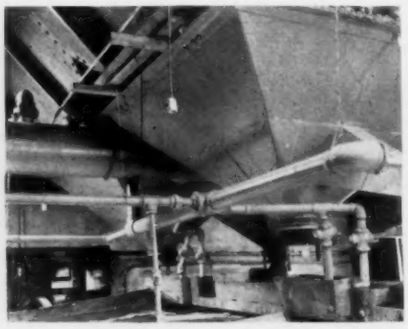
The Diesel-electric clam-shell dredge and some of the barges of gravel at the plant dock.

Before the concentrating tables were installed the company had tried almost every conceivable method of cleaning its product. Drag-boxes, screws, settling-tanks and jigs had been used with indifferent success. After the sand tables were found to be entirely satisfactory experiments with gravel were conducted on one of them. When these tests had demonstrated the feasibility of this method, the gravel tables were ordered. An hourly capacity of 40 tons of sand and 100 tons of gravel is now easily obtained as compared with a former total capacity of 110 tons per hr. According to the company, this improvement in quality and increase in capacity are accompanied by a considerable lowering of plant operating and power costs. Wash-water requirements are said to be no greater than with previous equipment.

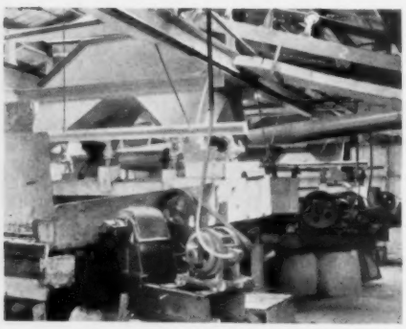
Another important feature is the fact that the company now has positive land control of its material instead of the former irregular river control. Formerly it was necessary to go as far as 30 mi. down Cumberland River in order to obtain suitable and clean material, and dredging areas had to be chosen with great care. With the tables in use such discrimination is no longer necessary and the dredge now operates within 5 mi. of the plant at all times. The



The reclaiming and mixing conveyor under the gravel-concentrator hoppers.



One of the inundators used to insure constant feed to sand tables.



Drives of some of gravel tables with one of feed conveyors at upper right.

savings in dredging, due mainly to the elimination of the former long hauls in which the loaded barges had to be towed upstream, is evident. Greater capacity, due to the elimination of delays in finding suitable deposits, has also been obtained.

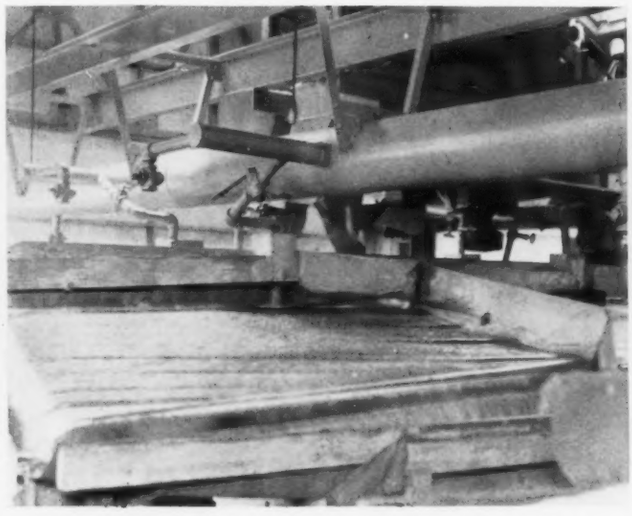
The concentrating tables used in this plant are the Deister-Overstrom diagonal-deck tables made by the Deister Concentrator Co. Each of the seven tables has a total deck length of 17 ft. and a width of 7 ft. 10 in. Each deck is divided into two operating halves by a transverse partition which in effect makes two tables out of each one. Each half deck has an end elevation and side tilt which cause the water and material to run from the feed corner diagonally across the tables to the opposite corner. The feed water is augmented by dressing water supplied through a water box along the length of the feed side. It flows almost at right angles across the riffles and, assisted by the differential reciprocating motion of the table, stratifies the material and carries the refuse materials, or tailings, off the side of the table in the order of their specific gravities. The cleaned high-gravity product, guided by the rubber riffles, is carried to the concentrate end of the table and discharged. A Linatex pad at the feed point on each table absorbs the impact and abrasion caused by the material and each table has a rubber cover under the riffles. Each table is given a reciprocating action through a fully-inclosed head motion running in oil. The tilting frame and main base are structural steel rigidly braced and the deck is high-grade seasoned cypress.

Concentrating tables were originally used in ore dressing and were considered suitable only for cleaning and separating fine materials. Later, however, they were applied to the cleaning of coal up to 2 7/16 in. in size with such success that tests made a few years ago demonstrated the possibility of cleaning gravel up to 2 in. in size. The makers state that foreign matter with specific gravities considerably lower than that of gravel can be removed on sizes up to this limit. Foreign material with specific gravities approaching that of gravel can be removed on sizes up to ¾ in.

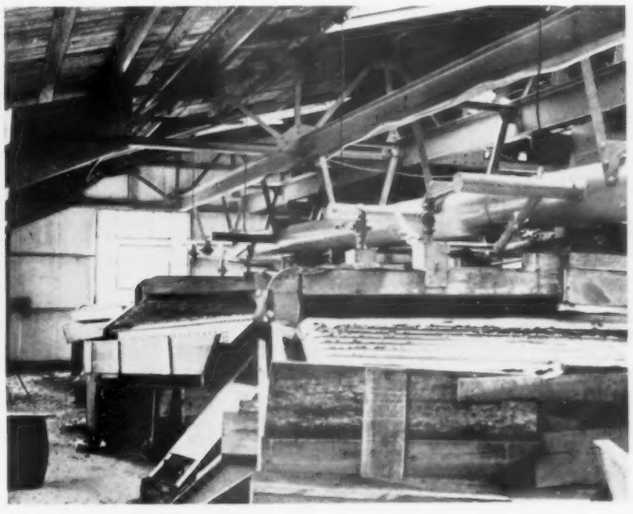
Sand and gravel are obtained from the bed of Cumberland River by means of the Diesel-electric clam-shell dredge *Herbert*, which also separates the two sizes of sand from the gravel and gives them a preliminary washing. Oversize gravel is wasted and any desired grades of sand can be produced. Barges of sand and gravel are towed to the plant site on the south bank of the river about a mile from down-town Nashville. A Diesel-engine tow-boat hauls the barges.

At the dock the barges are unloaded by means of an American Hoist & Derrick Co. stiff-leg derrick using a 1¼-cu.yd. Williams clam-shell bucket. This feeds a 30-cu.yd. steel hopper which discharges on a short 24-in. belt-conveyor. A second 24-in. belt conveys the material to a small hopper having a two-way discharge. When concrete sand is being handled this hopper discharges from one side on a 24-in. belt-conveyor which carries the material through a revolving chute to a 300-ton two-compartment steel bin of special construction and original design in the sand-concentrator building above the two sand tables.

Each of these compartments has a pant-leg bottom and is designed so that the sand is inundated before it is fed to the tables. At the bottom of each leg is an opening which allows the sand to flow into a smaller hopper or inundator surrounding the discharge point and extending part way up the side of the main hopper. The space between these two hoppers is kept filled with water which inundates the sand without allowing it to overflow, an overflow pipe keeping the water at the desired level. The inundated sand is discharged on the table without excess water through a special pivoted slide gate at the bottom of the inundator. In this manner a constant and positive feed to the table is assured. The gate is circular and has a semi-circular cut-out section, which gives a round discharge opening at any setting. In this manner each half table has its own feed. The two sand tables are operated at a stroke of 15/16 in., 0 end elevation, 4-deg. side tilt and at a speed of 295 r.p.m. Each one of them produces from 18 to 25 tons of washed sand per hr.



One of the gravel-concentrating tables in operation. Note water lines and gravel feeders above.



View showing concentrate ends of some of the gravel tables with launders at left.

The sand-concentrating tables discharge their refuse to the same flume as that which receives the gravel refuse. The clean sand is discharged over the ends of the tables into a Link-Belt drag-box placed under and between the two tables. The dewatered sand is then taken by a 24-in. belt-conveyor operating on 150-ft. centers and having an inclination of 20 deg. to a separate steel bin built over the skip track. Like the gravel hopper, this can discharge into the skip car for distribution to the storage-bins or concrete plant, but it also has a side chute for discharge to ground storage.

Brick sand is given sufficient cleaning on the dredge after it is separated and is handled from the barges direct to storage.

Gravel is discharged from the other side of the two-way hopper on a double-deck Roberts and Schaefer vibrating screen. This usually produces ¼-in. to ¾-in., ¾-in. to 1¼-in., and 1¼-in. to 2-in. gravels, which are discharged directly into three separate compartments of a storage-bin. Three individual belt-conveyors under these compartments carry the three sizes of gravel to the new building housing the five gravel-concentrating tables. The conveyor for 1¼-in. to 2-in. gravel supplies a single table. Each of the other two conveyors supplies two tables, one pair of tables for the ¾-in. to 1¼-in. gravel and the other pair of tables for the ¼-in. to ¾-in. gravel. These conveyors discharge into specially-designed hoppers, which feed the material to the tables by gravity through adjustable gates. The addition of water at the gates makes possible a constant feed to the tables.

The five Deister Concentrator Co. gravel-concentrating tables are Deister-Overstrom diagonal-deck units similar to the two sand tables and are specially designed for severe service. Each table is divided into halves, each half performing separately although a part of the same driven unit. Although these tables were designed specially for this operation and are called "Herbert" tables by the manufacturer, they are suitable for any similar plant.

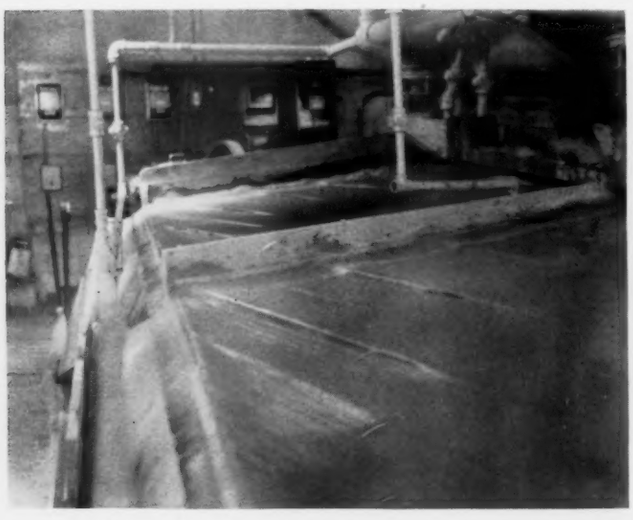
In addition to the feed water which is introduced with the gravel at one corner, dressing water is applied along the feed side of the table. The lighter refuse, wood and vegetable matter, in the gravel passes over the tailings side of the table into a discharge chute and is flumed a distance of 900 ft. back into the river. Heavier impurities, such as cinders, coal, lignite, soft stone, etc., also overflow at the tailings side of the table to the flume. The clean washed gravel follows the riffles to the concentrate ends of the tables, where it is discharged into launders. These empty it into five steel hoppers, one for each table, under the floor of the concentrator building. These have sliding gates of the company's own design. A 36-in. horizontal belt-conveyor on 50-ft. centers under these hoppers takes the gravel from them, either in separate sizes or mixed from the various hoppers. This conveyor discharges into a steel-inclosed bucket-elevator which is set on 37-ft. centers and discharges into a 25-cu.yd. steel bin. A skip car is loaded from this bin and discharges either on a conveyor running to the premixed-concrete plant or into the main plant storage-bins. Cars and trucks are loaded from these bins, both car and truck scales being used for weighing the shipments.

Sand and gravel are handled to and from ground storage by several locomotive cranes. The latest of these was purchased in June, 1934. It is an American Hoist & Derrick Co. 25-ton steam locomotive crane which has a 47-ft. boom and handles a 1¼-cu.yd. Williams clam-shell bucket.

The sand-and-gravel concentrating and handling equipment lay-outs were made by A. W. Conrad, mechanical engineer for the company, who has been responsible for the design of all the improvements made by the company during many years. Both concentrator buildings are of steel-frame construction with corrugated-metal siding and are supported on concrete foundations. Large steel-sash windows and skylights provide ample lighting.

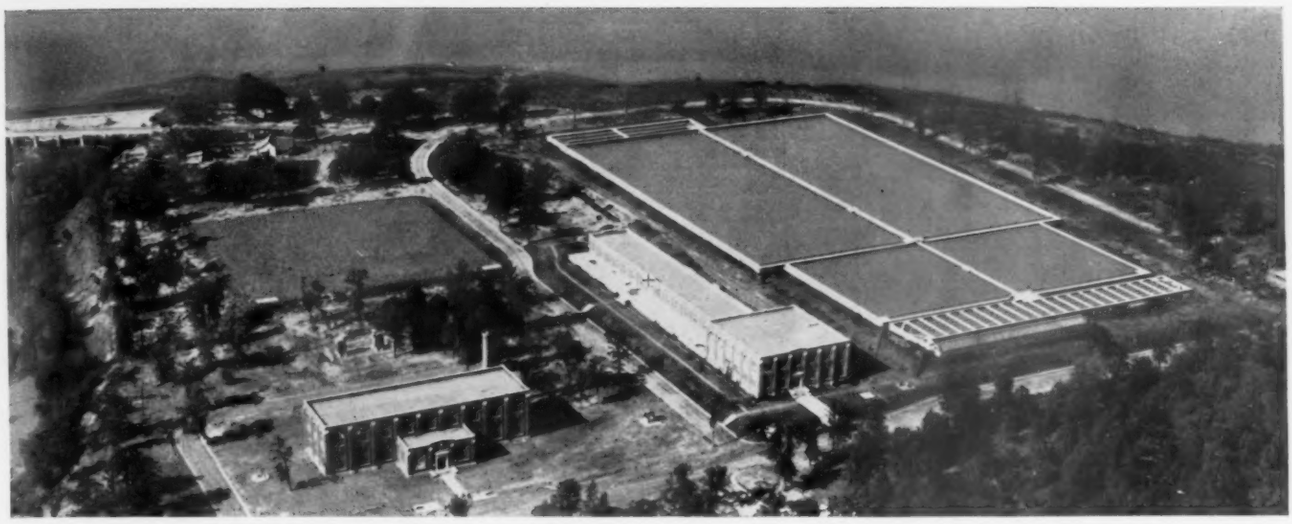
All the new belt-conveyor and elevator equipment was supplied by the Link-Belt Co., which had also

(*Continued on page 34*)



One of the sand-concentrating tables in operation. Impurities shown overflowing to flume at left.

The same sand table idle. Note the rubber riffles and the division into two operating halves.



Water softening and purification plant at Dallas, Texas. One of the many places where lime is of vital importance to the entire community. *(Fairchild Aerial Surveys, Inc.).*

Ten-Point Program for Selling Chemical Lime with Success and Profit

Knowledge of the Product and Fairness to Customers and Competitors Essential

By SIDNEY P. ARMSBY

IN order to make a success of selling chemical lime three things are necessary: (1) You must have a chemical lime for sale; (2) you must know its merits and limitations; and (3) you must *sell* it.

These statements may appear, at first glance, to be so obvious as to require no discussion, yet they are fundamentals which should never be overlooked by either the seller or the buyer of lime for chemical process work. Failure to observe any one of them may entirely counteract the best efforts put forth by either your production or sales departments.

That these three fundamental considerations are all interdependent will, I believe, be apparent from the following discussion, which is inspired by several years' experience involving the manufacture and sale of lime for a variety of industrial purposes, and is written in the hope that it may contain something of value to others who are similarly interested.

Producing Chemical Lime. —It is difficult, if not impossible, to give any exact definition of just what constitutes a "chemical lime," for two reasons—first, because the term is commonly used in such a generalized manner to apply to any lime that is utilized by any chemical manufacturing industry, and second, because all uses of lime involve chemical reactions and, in that sense, all limes are chemical limes.

Definition is made still more difficult by the fact that a lime which is of good efficiency when used in one type of work may be considered of poor quality for some other processes. There is, however, a common understanding among both producers and consumers of lime that chemical limes are distinguished from masons' limes by being generally purer, more uniform in composition, more highly reactive chemically, of a greater degree of fineness, and more nearly free from core. Just how sharply this division is made depends in some degree upon the requirements of the industries being served, and to some extent upon the other fellow's sales talk, but it seems obvious that the lime which possesses the greatest number of desirable properties in the highest degree is the best chemical lime. Equally obvious is the fact that if your lime does not possess these

WHILE primarily of interest to lime manufacturers, Mr. Armsby's article should be read by producers of all kinds of nonmetallic minerals. He preaches the gospel of sound selling and advocates principles of universal validity. Some of it has been said before, but never any more forcefully and certainly at no time with any more authority. Mr. Armsby has applied these principles consistently and successfully in recent years and they have met every test to which keen competition has subjected them. He has a message of great importance to every one faced with a selling problem.—EDITOR.

properties, it is impossible for you to sell it successfully to informed chemical customers in competition with other limes which do possess such properties and which are available at reasonable prices.

No one can convert a low-grade or impure compound into a high-grade chemical reagent except through some type of refining or purification process, and this is especially true of lime that is intended for reagent use. If the lime contains impurities that are harmful to the particular process at hand, or if it carries too high a percentage of inert ingredients, or if it is too coarse and gritty to be used efficiently, then its quality must be improved by proper changes in manufacturing methods, or it will be forced to withdraw in favor of some other and more suitable grade of lime.

The principal impurities ordinarily present in high-calcium limes are silica, iron oxide, aluminum oxide and magnesium oxide*, these generally being introduced as components of the raw material used. In most cases it is either impossible or uneconomical to reduce the amounts of these impurities below certain definite figures as long as a particular raw material is being utilized, and they will, therefore, serve as limiting factors of the reagent value of any particular lime. Under certain conditions, or for particular industries, a high total of these impurities may definitely classify a lime as being "non-chemical" in grade, and efforts to sell it as "chemical" will be wasted.

Other undesirable ingredients, however, are susceptible to control or modification. Excess core can be eliminated by changes in the methods of burning or by a more careful selection of material. Excess moisture in hydrate may be reduced by more careful control of hydrating operations. Fineness may be increased by changes in hydrating or milling, or both. A study of the past performances of your plant, and a knowledge of the market requirements, may reveal many opportunities for such improvements to your operations which will result in your being able to command a market that was formerly closed to your products.

Classifying the Properties of Chemical Lime.—While hundreds of industrial operations make use of lime in various ways, it may be stated safely that very few of them have the same lime requirements as far as detailed chemical properties are concerned, and a lime that is practically ideal for one industry may be very far from it when used in some other process. Certain chemical reactions in which lime is used may be slowed down by the presence of a small amount of some individual impurity which exerts an undesirable catalytic effect, whereas the same catalyst may be beneficial in some other case. Specific ingredients of the lime may be inert in one process and may produce undesirable chemical compounds in another process. Small percentages of manganese, arsenic, phosphorus, sulphur or other elements may be beneficial, harmful or of no importance, depending upon process conditions and the character or utilization of the finished products being made.

Physical properties are also of great importance, in some cases overshadowing variations in chemical composition. A high percentage of water-soluble calcium oxide becomes of little moment if the lime settles out of suspension too quickly to allow completion of the reactions which are desired. A certain amount of gritty material may, in some cases, be beneficial in promoting sedimentation or coagulation, but if present in a lime intended for grease making, rubber compounding or similar operations, would be ample grounds for condemnation regardless of its other excellent qualities. An extra degree of fineness in lime may be worth a premium in one industry and be of little importance in another. Excess moisture in hydrated lime has been demonstrated to be harmful to some process operations, while for other purposes it is considered as merely so much inert material.

Other illustrations could be cited, but enough has been said to show that the more accurately you can classify the detailed chemical and physical properties of your lime, the more intelligently you can direct both your operating and sales departments, producing the grades of lime best suited to the requirements of your customers, and concentrating sales efforts on the industries you are prepared to serve most efficiently.

Marketing Your Products.—Having raised your production to the highest possible degree of efficiency, and having accurately catalogued both the desirable and undesirable characteristics of the various grades of lime you are in a position to make, the next step is to develop an efficient system of selling your products. This requires: (1) a high type of merchandising service; (2) an appreciation of the fact that you are manufacturing a high-grade chemical reagent that is adaptable to a great variety of uses; and (3) a sincere determination to sell your own products strictly on the basis of merit.

These ideals can be maintained by adherence to a few guiding principles which will sooner or later manifest themselves to anyone who engages in this line of work. These may be listed as follows:

(1) Truthful and Dignified Advertising.
(2) Conscientious Follow-up.
(3) Appreciation of Customer's Viewpoint.
(4) Technical Help to Customers.
(5) Fairness to Competitors.
(6) Keeping Abreast of the Times.
(7) Employment of Technically-Trained Salesmen.
(8) Coöperation of Sales, Production and Technical Departments.
(9) Honest Service at All Times.
(10) Support of Your National Trade Association.

Without claiming that these "ten commandments" constitute a complete formula for successful selling, I believe the following discussion will show that their observance will go a long way toward securing satisfied customers and larger

*Some industrial processes require the use of a high-magnesium lime, in which case this element may become the measure of its value instead of determining its lack of value.

The modern oil-refinery utilizes lime for a great variety of processing operations.

profits, in addition to which your experiences will be mighty interesting and your business activities will be highly satisfactory to yourself as well as to your customers.

Truthful and Dignified Advertising.—This principle does not mean that every advertisement you publish must be a complete lecture-room treatise on a given subject, nor does it mean that exhaustive research studies must be made to furnish corroboration of all the statements you make about your chemical lime. It does, however, call for the publication of true statements which you are prepared to back up by service, and it requires the avoidance of anything that has the appearance of "bally-hoo" or that is capable of being interpreted as uncomplimentary to the audience your advertisements are designed to reach.

If the hypothetical mouse-trap builder were alive to-day, and found that a suddenly-created demand existed for an efficient means of exterminating mice, he would be at a decided disadvantage if he manufactured his traps in a wilderness and depended upon the public to come to him without solicitation. (And this in spite of any road-building programs now under way, or projected.). Instead of such a rural location, he would build his plant in the heart of the city if possible, and would immediately run a full-page advertisement in the local newspapers, showing a picture of his factory and informing the public that he was making a superior mouse-trap; that he was selling it at a reasonable price; that he had a convenient downtown location; that visitors were always welcome; and that plenty of free parking space was available.

And the next day the papers would carry a bigger advertisement announcing that So-and-so's Drug Store was offering a week-end special on a "mouse candy" which was guaranteed to attract all the mice in your block; cause them to turn right around and go over into the next county to die; and "why bother with baiting and setting traps anyway?"

Faced now with competition, what does our trap manufacturer do? He investigates the merits of both the poison and his traps; secures accurate data as to comparative costs by the two methods; improves the quality and lowers the cost of manufacture; invents a self-unloading and re-setting attachment for the trap; and then publishes a statement showing that a dollar's worth of his traps, if properly used, will catch more mice in the same length of time than a dollar's worth of any poison on the market, taking care that this statement reaches the individuals who are active in the mouse-extermination campaign, and accompanying it with a set of instructions as to the best method of baiting and placing the traps. In this way he shows that he is a leader in his industry, and that he is basing his business on efficient service to his particular field of trade.

Whether it be mouse traps or chemical lime, it is essential that the product be advertised if it is to be sold in this day of industrial competition. It is equally necessary, if proper results are to be secured, that any advertising campaign accomplish two fundamental purposes. It should first establish the identity of the advertiser and his products, after which it should arouse a real interest in the quality or utility of the products themselves. Constant repetition, by continued advertising, may be sufficient to acquaint the readers of a certain periodical with the fact that you are the manufacturer of a lime to which you have given a certain brand name, but if you fail to tell them something about this lime, your advertising appropriation has been largely wasted. You have failed to take the second step, and only accomplished part of your purpose, and the small part at that.

If, on the other hand, you start out by saying that your lime is the best in the world; that no other lime can even approach it in quality; that it excels all others for any possible use; that anyone who fails to buy it is putting himself in a hopeless minority by passing up the opportunity of a lifetime; or if you make similer blanket claims, without any substantiation, then you are wasting all your advertising money. The chances are that most of the claims you have made are untrue, and instead of arousing an interest in your products you will

merely acquire a reputation as a bad business risk.

If you would successfully meet competition and establish the merits of your lime in the minds of prospective customers, you will follow the example of the hypothetical mouse-trap maker by studying the merits of your products for use in the particular industries you are trying to reach, and by publishing real data which will give the user some information as to what can reasonably be expected if your lime is applied to his operations. If you say in print "We guarantee our lime to conform to the following analysis, made by A. S. T. M. methods, . . ."; or "In the treatment of ——— distillates by the ——— process, it has been found that the true efficiency of the lime used depends upon both its available CaO content and its degree of fineness. We guarantee not less than ——% available CaO and not more than ——% retained on a 325-mesh screen-tests to be made by the official methods of the ——— Association;" or if you at least follow some such principle, by advertising real facts, then you will accomplish the main purpose of arousing an interest in the mind of the reader. He will be induced to make comparisons between the properties of your lime and others—or, perhaps, between lime and some competing material—in the hope that he may improve his process by using a better, more efficient reagent.

In addition to arousing the interest of your prospective customer, you will also have acquired his respect, because what you say about his business is in line with what he knows to be true, and you will have impressed him with the idea that you really know something about lime and that you are telling the truth about your own products. The "mouse trap" referred to is just as much your business as it is the other fellow's, and if advertising is required to meet competition, then you should make your advertising as effective as possible by making it dignified instead of dictatorial, and truthful instead of merely amusing. It is the simplest kind of advertising to write after all, and it pays the biggest dividends.

Conscientious Follow-up.—If you have succeeded in arousing the interest of some desirable firm which is in position to purchase your lime for use in a particular chemical manufacturing process, you may know that your campaign has been effective up to that point, but do not think for one minute that the job is done. Just because your advertising has made a good impression on the superintendent or the chief chemist, it does not necessarily follow that within a few minutes your telephone will ring and you will be asked to accept a contract to furnish your best grade of lime. It may be that the chemist is required to submit a request to the general manager, stating the reasons why he would like to try out this newly-advertised product. Or, perhaps, extensive laboratory tests will be required in order to determine whether there are any ingredients present in your material—but not mentioned in your advertisement—which would be harmful to their process. Or there may be many other reasons why they want to know more about your product, or your ability properly to fulfill a contract, before there will be any possibility of getting even a trial order.

Suppose you have sent out to a selected mailing list of important "key" men a newly-prepared 12-page booklet describing the advantages of your lime for use in water-treating, and that you have inserted in the back of this treatise a return post-card asking for samples of lime and various other pieces of advertising matter which you have ready for distribution. In a few days these cards begin to come in, and you immediately feel a glow of satisfaction over the fact that your latest advertising idea has been so effective and that so many of your prospects have found the booklet interesting enough to read it through to the point where they found the card, and that they are now anxious for more information. You still have not sold any lime, however, and probably will not *until you take the action which the prospect's interest invites you to take.*

By letting you know that he is interested in what you have said about your lime the potential customer has opened the door for you to become acquainted with him and his operations, and has given you an opportunity to tell him more about your products with a view to establishing permanent business relations. It is your cue to follow up, promptly and aggressively. You may send the samples he asks for, accompanied by a letter thanking him for his interest; calling his particular attention to a certain grade of product; assuring him that commercial shipments will be of the same quality as the samples; or telling of your shipping facilities. Or, you may take advantage of the opportunity to send him some other piece of advertising matter that bears more directly on his particular operations. Possibly one of your salesmen is in the neighborhood and you can have him call to express your thanks for interest displayed. Or, if the prospective business is important enough, you can catch the next aëroplane and go there in person. If the interested person is going to do business with you, he will undoubtedly appreciate a personal acquaintance with at least someone of your organization, and if the new account is worth having at all it is certainly worth going after.

If you merely mail the samples asked for, without any comment, or if you just pat yourself on the back for having devised such a good advertising plan; in other words, if you fail to express an interest in the one whose interest you have aroused, you will have once more wasted the money you spent on advertising. By just letting Nature take its course at this point, you will be paving the way for your competitor to reap the benefit of your advertising, and *you* will be the one who has neglected the golden opportunity. Your well-planned advertising has given your products the lead in a handicap race, and the right kind of follow-up on your part will constitute the horsemanship that will bring your mount home a winner.

The importance of this "horsemanship" will be made more evident in following sections, in which I shall attempt to outline just a few of the things that can profitably be done in establishing and

maintaining direct contact with your chemical-lime customers.

Appreciation of Customer's Viewpoint.—When a carpenter buys a good-looking, well-tempered and keen-edged brace and bit at a higher price than he would have to pay for one of inferior quality, he does not pay the extra money solely for appearance nor for superior tempering. And when you pay a premium for coal, oil or gas of high B.t.u. value you do not do so merely becuse it has this extra value. The carpenter pays more for a better tool because it will do more efficient work, and you pay more for your fuel because it will produce more lime per dollar invested. To put it briefly, what you are actually buying is lime, and the carpenter is in reality buying holes. It is the cost per ton of lime burned or per hole bored that really matters, and not the price of a thousand cubic feet of gas or a brace and bit.

In exactly the same way the purchaser of lime to be used as a chemical reagent is not buying the lime just because it is made by a friend of his, nor because it looks so nice and white. Such factors may influence a few sales of lime, but they most emphatically are not the primary reasons for its use. Chemical lime is a tool with which the plant operator works, just as truly as a brace and bit is a tool for the carpenter, the "holes" in this case being such practical things as gallons of water treated, pounds of grease produced, tons of sugar refined, or other similar net results.

By keeping in mind the fact that the purchaser of your chemical lime is "buying holes" in exactly the same way you are, you will easily find common interests on which to build up a business relationship that may prove profitable to both parties. He wants to increase the efficiency of his operations, and if your lime is a better tool for this purpose, there is every reason why he should buy it and no reason why he should not. Just remember that you are selling a service rather than a mere material and, if your material is capable of giving the service desired, you need have no fear that the sale is impossible or that returns will not be adequate.

Technical Help to Customers.—If you have succeeded in arousing a real interest in the quality of your products, and if you have gained the respect of your prospective customer, you are then in position to inspire his confidence by helping him to buy his chemical lime. You are not expected to tell him how to operate his business, but you are under a moral obligation to show him what your lime will do under a given set of conditions; how it can be handled or processed to the best advantage for specific applications; what peculiar or unique properties it has that make it of special value for certain operations; or any other facts that will enable him to make more efficient use of it in his plant. He may also welcome any general information about lime that will enable him to understand more completely just what he really ought to expect of any good lime, whether it be yours or not. Just as the detailed technical discussion of such things as flash point, viscosity, pour test, gum content, or other factors controlling the quality of a lubricating oil, really mean very little to Mr. Average Motorist, so there is a more or less unconscious, or unintentional, tendency among users of chemical lime to assume that any good grade of lime is just about as good as another and that, aside from any especially objectionable impurities, it is largely the price and the calcium-oxide content that governs its value. Your customer may not know that if he varies the amount of water used in slaking your lime he will decrease the percentage of waste removed on his screens. Or he may not realize that a purchase specification calling for 96 per cent. CaO can be far less valuable to him than one requiring 90 per cent. *available* CaO. Or perhaps he is insisting on extreme fineness at any cost, when what he really requires is a lime with a slower settling rate, or a lower moisture content, or some other property that he has failed to consider.

Such detailed information, diplomatically conveyed, has often increased the efficiency of a lime-consuming process, made a friend out of a former opponent, or corrected a grave misunderstanding. I know of one case where the operator of a municipally-owned water-softening plant was commanded to use only one certain brand of lime because the city council was under the impression that this was the only lime on the market that was "specially prepared for water-softening, and that other limes would harden the water." To correct this situation, an opportunity was created whereby the councilmen were given a simply-worded lecture on elementary chemistry, with special reference to lime and what it does in the water-softener. After that the market was open to all lime manufacturers, various limes were evaluated on the basis of merit and the councilmen were genuinely grateful for the information they had received. Fortunately, only a few of your chemical-lime customers are in need of such primary instruction, but there are many opportunities for educational work even among the largest users, who are generally the ones most anxious to find out all they can about the materials they employ.

As a general rule, if you convince the purchaser of your products that you really know what they are and what they will do, you will get your customers into the habit of coming to you for information; you will understand their operations much more thoroughly; they will appreciate your ability and willingness to give them valuable service; and you will not only increase your volume of sales, but will also establish a friendship founded on mutually-satisfactory business, which is much more desirable than any business you may secure solely on the basis of personal friendship.

Fairness to Competitors.—One of the safest and surest ways to meet competition is just to mind your own business. This statement is not intended to be abrupt, but merely to convey a fundamental truth. As stated at the beginning of this article, the fact that you are engaged in marketing chemical lime should be based on the fact that your lime possesses certain merits as a chemical reagent, and

that you know what these merits are and for what process operations your material is best suited. Why, then, worry over the fact that John Smith or Henry Jones is selling to a certain firm whose account you would like to have? If your lime will prove more efficient for the firm in question, there is nothing to prevent your selling it there. By establishing the merits of your material, and thereby increasing the efficiency or lowering the manufacturing costs of the customer, you will not in any way have affected the efficiency of the competing material. It remains just as it was before so far as quality goes, and you have simply shown the customer that yours is better for his purpose. By doing this you have eliminated the competition by doing just what was recommended above, simply minding your own business and letting the other fellow do likewise. It is neither necessary nor advisable to "knock" the other material; in the first place because it will lose you the respect of the customer, and in the second place because you may make statements that you can not prove or that will come back to you like a boomerang at some future time when the conditions are reversed.

Another important advantage of this policy is the fact that if you are devoting all your efforts to selling your own products, you can not be accused of interfering with anyone else. You have been absolutely fair by admitting that the other material has the merits it has demonstrated, and if yours is a superior product, this does not in any way reflect on the integrity or honesty of your competitor. Be as fair to the other fellow as you hope he will be to you, and you will be less likely to become the victim of unethical practices than if you try to be unethical yourself.

Finally, it is essential to remember that, in many cases, your real competition is not from another lime manufacturer, but from the producers of some other material. Two bakeries in a given territory may compete for the favor of the bread-eating public, but both are fighting the competition of the housewives who make and consume hot biscuits three times a day. Two mouse-trap manufacturers may argue over the merits of their respective traps, but they combine forces to fight the efforts of the poison dispensers or the indifference of the individuals who do not care whether the mice are exterminated or not. You, too, have a common interest with other lime manufacturers, when it comes to a comparison between lime and other competing reagent materials.

This competition also resolves itself into a matter of fair play and selling on merit, the entire lime industry being just as much interested in the outcome as you are. You may run across some industrial operation in which an alkali other than lime is being used for neutralizing purposes, where you believe lime could be more advantageously utilized. On investigation, you may find that the existing process is one that has always been employed, and that nobody has even thought of trying lime because "my father invented the process and I am following his directions," or because "we were told that lime would not be satisfactory," or perhaps just because it never occurred to them as a possibility. Here is a wonderful opportunity for you to advance the cause and to establish the value of lime as a chemical reagent. Find out what functions the lime would have to perform, in case it could be used; the conditions under which it would have to be applied; the factors that would limit its efficiency; and the operating costs under present conditions. Then study the properties of your lime and of those made by other lime companies; make tests to see if the requirements can be met; enlist the help of your national association and, if necessary, of other research agencies to determine whether the process can be simplified in some way by reason of the peculiar properties of lime, which are not possessed by the other material. In other words, try to work out some definite saving or other worth-while service which can be realized if the prospective customer becomes an actual consumer of lime.

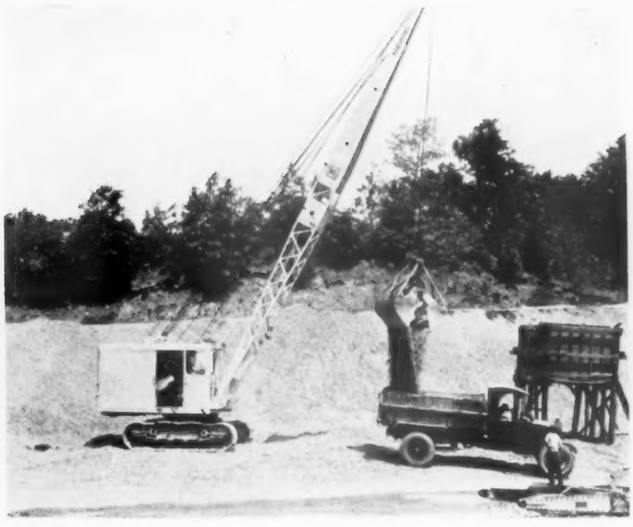
Then lay the proposal before him for consideration and criticism. The chances are he will welcome a discussion with you, and it is entirely possible that a worth-while development will result. Perhaps a trial run will show that some minor changes are necessary, and it is of course possible that some other grade of lime will be found more efficient than yours. Nevertheless, if you succeed in establishing the fact that lime will do the job better and more economically, you will have done all the things I have been talking about thus far. You will have put across an effective piece of advertising; followed up an important sales prospect; promoted the best interests of the customer; justified your reputation for knowing your product and telling the truth about it; enhanced the value of lime as a chemical reagent; and you will have acted fairly by not gaining any undeserved advantage over the other group of manufacturers. Even though you should not secure the immediate objective of the particular bit of business you were seeking, you will have benefited the industry of which you are a part, and you will share eventually in such benefits.

(To be continued)

Gravel Cleaning *(from page 28)*

supplied existing conveying equipment and the sand-drag. Republic conveyor belting is used. Each table is operated by a 3-hp. motor connected by V-belt to the driving mechanism but only a part of this power is actually used. The two sand tables are driven through Republic Champion V-belts by Fairbanks-Morse motors. The five gravel tables are driven through Manhattan Condor V-belts by three General Electric, one Westinghouse and one Fairbanks-Morse motors. The belt-conveyors are also V-belt driven by individual 5- and 10-hp. motors except for the gravel-mixing belt-conveyor, which, together with the elevator feeding the skip hopper, is driven by one motor through Link-Belt roller-chain drive. The skip car which conveys sand and gravel to plant storage is operated by an American Hoist & Derrick Co. hoist.

The final screening and storage plant with conveyor from crusher and scalping screen at right.



The 1½-cu. yd. gasoline crane loading from stock-piles into trucks for shipment.

Small Movable Gravel Plant Uses Trucks for Pit Haulage and Delivery

Fills Temporary Demand Until Local Business Justifies Permanent Plant

By W. E. TRAUFFER

INDICATIVE of a trend, which has become increasingly evident in the aggregate-producing industries in the past few years, is the plant of Burton Canfield, Inc., at Cedar Grove, N. J. The slackening in building construction resulting from the depression and the vast amount of highway construction and maintenance made possible by P.W.A. grants and loans have brought about the development of a type of plant combining the advantages of both portable and permanent plants. Such a plant usually supplies local demand entirely and is so constructed that it can be taken down and reassembled at another location when necessary.

The Burton Canfield plant, which went into operation in February, 1933, has a capacity of about 700 tons per day and was built to supply a local demand arising within a radius of about 15 mi. Most of the product is used for state highway and bridge work, some is used for private construction, and the company also supplies several material dealers. The plant and all its equipment were designed and furnished complete by the Iowa Manufacturing Co., Cedar Rapids, Ia. The economy of this plant is evident from the fact that five men conduct all the operations when it runs at full capacity.

The deposit consists of about 100 acres of glacial deposit averaging about 50 per cent. sand and containing no large bowlders. The overburden is light and is removed occasionally by a Caterpillar 70 tractor equipped with a bulldozer. A 1-cu.yd. Koehring gasoline crawler shovel loads the excavated material into two Mack 5-cu.yd. trucks which

The 1-cu. yd. gasoline shovel in pit loading into truck.

Truck discharging over grizzly to conveyor feeding scalper.

Truckload of material being weighed at plant office.

Scalping screen and crusher in foreground. Screening and storage plant in background with sand-drags at right.

The scalping screen with elevator from crusher. Conveyor to screening plant at left and hopper in background.

haul it a distance of about 1,000 feet to the plant.

The trucks back up a dirt ramp and discharge over an 8-in. sloping-rail grizzly. The oversize material is sent to a waste pile, and some of it is sold for building and wall construction. The minus 8-in. material is discharged by an apron feeder on an 18-in. belt-conveyor operating on 30-ft. centers. This discharges on a 42-in. by 10-ft. revolving scalping screen fitted with 1¼-in. perforated plate. The rejects are chuted to a 9-in. by 24-in. Cedar Rapids jaw crusher set to produce ¾-in. minus material. A chain-bucket-elevator returns the crushed gravel to the scalping screen. The material passing the scalping screen is carried on an 18-in. belt-conveyor operating on 100-ft. centers to the top of the screening plant. U. S. Rubber Co. belting is used on both conveyors.

Sizing is done by a 48-in. by 18-ft. revolving screen, which has ⅝-in. perforated plate on the main barrel and a ¼-in. sand jacket and is equipped with sprays. The two sizes of gravel produced are chuted to separate 40-cu.yd. steel bins. The minus ¼-in. material is fed to two sand-drag tanks arranged in series. The first of these removes concrete sand and the second plaster sand, both materials being discharged separately to stock-piles.

The waste water and silt from the sand-drags are discharged through an 8-in. pipe-line into a series of three earth-fill settling basins. Each basin has about 1 day's capacity. After settling for a day in each basin the water is released to a brook. Wash-water for the plant is obtained from this brook by a Worthington centrifugal pump rated at 800 gal. per min. The silt collected in the basins is sold for filling purposes.

A 300-cu.yd., 3-compartment Erie Aggremeter bin located near the plant is used to load batched aggregates. A Koehring gasoline convertible crane handling a 1½-cu.yd. Browning clam-shell bucket keeps this bin full.

Trucks also haul excess gravel and sand to large stock-piles, from which they are loaded into trucks when required by the crane. Two Mack trucks, in addition to those in the pit, are used to deliver aggregates, and additional trucks are hired when needed. Goodyear tires are used on all the company-owned machines.

Power for plant operation is purchased, but the company has a stand-by unit which can operate the plant in case of power failure. This consists of a General Electric 180-kw. generator which is driven by a 4-cyl. Hercules gasoline engine. Four General Electric motors drive all the plant equipment. The pump is direct-connected to a 40-hp. motor, and a 10-hp. motor drives both drag-tanks. A 30-hp. motor drives the crusher, feeder, elevator, and short belt-conveyor, and a 15-hp. motor drives the sizing screen and the long belt-conveyor.

The company has just completed a very attractive and modern plant office built of brick and hollow tile and with concrete foundations and floor and steel-sash doors and windows. One room houses a Meyer 33,000-lb. truck-scale.

Rewashing Stone (from page 24)

dor V-belt drive by a 5-hp. General Electric motor at the discharge end of the screen. The drive mechanism imparts a combined conveying and screening action through flexible supports connected to the screen-deck frame. Similar supports connect this frame to a balance frame and this in turn to the main frame, on which the motor is mounted, in a manner which greatly reduces vibration.

The traveling frame on which the screen is mounted travels on rails attached to the bin supports. It has four wheels, two at each end, each pair being solidly attached to an axle. A 2-hp. motor moves the screen to the desired bin through a gear drive on one of the axles. The electric cable for this motor is wound on a spool which automatically winds or unwinds as the screen moves.

The cars to be loaded are "spotted" and removed when full by a Plymouth 8-ton standard-gage gasoline locomotive which is also used for switching. This locomotive regularly hauls loaded cars one at a time up a 2-per cent. grade on a sharp curve.

MEN OF THE INDUSTRY

GEORGE F. BAYLE, JR.

GEORGE F. BAYLE, Jr., vice-president and general manager of the Glens Falls Portland Cement Co., Glens Falls, N. Y., was brought up in the cement business and for more than twenty years has been an important factor in the industry in New York State and the surrounding region. Mr. Bayle's good counsel has been frequently sought in the interests of the industry and since 1933 he has served continuously as an active member of the Committee on Accident Prevention and Insurance of the Portland Cement Association. He has also been to a large extent responsible for the excellent safety record achieved by his company. Mr. Bayle is a son of George F. Bayle, Sr., president of the company and one of the best known surviving pioneers of the industry.

Personal Mention

Stanford T. Crapo, vice-president and treasurer of the Huron Portland Cement Co., Detroit, Mich., was reelected a Class B director of the Federal Reserve Bank of Chicago on November 16. Mr. Crapo was elected by member banks in group one of the seventh federal reserve district.

Robert F. Turner, after more than 12 years of service in the territory sales force of the Fischer Lime & Cement Co., Memphis, Tenn., is leaving that concern to join the Philip Carey Co., Cincinnati, O., manufacturers of roofing and insulation products. He will be in charge of a sales and distribution unit of the Carey concern in a city to be announced later. The Fischer Lime & Cement Co. is the Memphis distributor for the Phillip Carey Co.

Chas. W. Lovell has been appointed by the Portland Cement Assn. as its representative for the state of Kentucky. His offices will be in Louisville.

F. R. Kohnstamm has been appointed manager of the Lighting Division of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. He has been associated with the company in various capacities since 1917.

John K. McCabe, assistant manager of the San Francisco office of the Hercules Powder Co., Wilmington, Del., has been made an assistant director of sales with offices at Wilmington. **J. B. Johnson,** for the past five years superintendent at Hercules, Cal., succeeds Mr. McCabe.

Roscoe Seybold, former comptroller; **Wm. G. Marshall,** former assistant to vice president; and **Ralph Kelly,** former director of budgets, were elected vice presidents of the Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa., at a recent meeting of the board.

Whitley B. Moore has been appointed general manager of the Industrial Division of The Timken Roller Bearing Co., Ohio. His previous position was that of sales manager.

Harry M. Green has been appointed manager of Mechanical Goods Sales, Pacific Coast Division, which is comprised of the Los Angeles, San Francisco, Portland, Seattle and Salt Lake City branches of United States Rubber Products, Inc., New York City. Mr. Green will coördinate his activities with those of J. B. Brady, general manager of the Pacific Coast Division, with headquarters in San Francisco. In addition, he will continue as manager of Mechanical Goods Sales in the San Francisco branch.

Obituary

C. O. Bartlett, 85, founder of the C. O. Bartlett & Snow Co., Cleveland, Ohio, died November 28, at Brecksville, Ohio.

Forrest H. Guild, 58, treasurer and manager of Vermont Mineral Products, Inc., Chester, Vt., producers of ground soapstone, chiefly for use in roofing products, and a member of The National Association of Talc and Soapstone Producers, died on November 8 from an acute attack of Bright's disease. Mr. Guild organized Vermont Mineral Products, Inc., six years ago.

Capt. R. J. Stewart, president of the Pioneer Sand Co., St. Joseph, Mo., died Nov. 19 at his home in that city. He was one of the most colorful personalities among Missouri River men and in his 25 years with this company had worked his way up from a river boat pilot to president. He had also been general manager of the company for the past 16 years.

C. L. O'Neal, 83, a veteran of the lime industry in the district around Calera, Ala., died Nov. 28 at his home in Calera after a brief illness. Mr. O'Neal for 40 years operated the O'Neal's Lime Works at Eureka, Ala., which he sold in 1921. This property is now owned by the Alabama Lime & Stone Corp.

Otto L. Sturzinger, for many years an assistant superintendent for the Kelley Island Lime & Transport Co., Cleveland, O., died recently at his home in Genoa, O.

Ralph M. Dravo, 66, vice president of the Keystone Sand & Supply Co., Pittsburgh, Pa., died Nov. 11 at his home near that city. Mr. Dravo was also president of the Dravo Contracting Co., and chairman of the board of the Dravo Corp.

William H. Caffery, 79, founder of the Kansas City Portland Cement Co., Kansas City, Mo., and later the Bonner Portland Cement Co., Bonner Springs, Kan., died November 4 at the home of his son in Kansas City. Mr. Caffery was the first to bring the cement industry to the middle west, and in the course of his career in Kansas City he was president of the Plomo Mining Co., general manager of the Missouri Coal & Mining Co., director of the Bonner Springs Oil & Gas Co., a director of the Farmers' State Bank of Bonner Springs, and vice-president and director of the Bonner Portland Cement Co. After severing his connections with the cement industry he was for 15 years an official with the Western Crushed Rock Co. and the Kansas City Sand Co., retiring as president of those organizations, when his health began to fail. He then entered the real estate business, retiring from that ten years ago.

Jacob B. Millard, 81, retired quarry operator, former city councilman, and prominent banker and philanthropist, of Lebanon, Pa., died at his home in that city November 11 from pleuropneumonia after a brief illness. Mr. Millard came to Lebanon in 1885 and founded the present H. E. Millard quarrying and lime manufacturing operations. He retired from active business on April 1, 1917, when he was succeeded by his son, Harry E. Millard, of Annville, Pa.

E. E. Lepine, 60, vice-president of the Standard Lime Co., Ltd., Joliette, Que., Canada, a subsidiary of Gypsum, Lime & Alabastine, Canada, Ltd., Paris, Ont., died recently. He founded and organized the Standard Lime Co., Ltd., in 1904, and due to his efforts the company became the most important lime manufacturing enterprise in Canada. He retired in 1930.

Coming Events

January 22-25, 1935, Washington, D. C.—Annual Convention and show, American Road Builders' Assn., Willard Hotel, Washington.

January 27, 1935, Chicago, Ill.—Independent annual meetings of the directors of the national crushed stone, sand and gravel and slag associations. Palmer House.

January 28, 1935, Chicago, Ill.—Meeting of the Code Authority of the mineral aggregates industries. Palmer House.

January 28-31, 1935, Chicago, Ill.—Independent conventions of National Sand & Gravel Assn., National Crushed Stone Assn., and National Slag Assn. with some joint sessions. Palmer House.

February 1, 1935, Chicago, Ill.—Meeting of Executive Committee or Council of the Code Authority of the mineral-aggregates industries. Palmer House.

New Corporations

THE MANUMUSKIN SILICA CO., Ocean City. Capital $12,500. Agent, John J. Hoppin. To deal in building materials.

CHEROKEE SAND & GRAVEL CO., INC., Knoxville, Tenn. Capital $25,000. Incorporators, H. N. Carmichael, C. L. Carmichael, and W. C. Kinzel.

STRATHMANN SAND & GRAVEL CORP., Camden, N. J. Capital $100,000, preferred and 250 shares no par common stock.

G. L. BALDWIN, INC., Providence, R. I. Capital 500 shares common, n.p.v. Incorporators, Edward M. Brennan, Andrew P. Quinn, and George A. Jacobson. To deal in sand, gravel and general construction.

CITY BRICK & SAND CO., INC., Kings, N. Y. Incorporators, Louis Goldsmith, 617 Rutland Rd., Brooklyn, N. Y., Wm. Brown and Samuel Brown.

GEO. M. PENDERGAST & CO., INC., Milwaukee, Wis. Four hundred shares @ $100. Incorporators, O. M. and Geo. M. Pendergast, and Florence Gnatzig. To deal in sand, clays, etc.

THE INDUSTRIAL SAND & MATERIAL CO., Detroit, Mich. Capital $25,000, of which $10,000 has been paid in.

THE WISCONSIN MARBLE CO., Ashland, Wis. Incorporators, A. E. Greene, J. A. Pomeroy and E. Bazynski.

THE BRADLEY HILLS QUARRIES, INC., Bethesda, Md. Incorporators, Charles H. Merryman, James L. Richards, and others.

THE ACME SAND CO., Columbia, S. C. Capital $4,000. Officers, T. C. Stevenson, president; John Richardson, vice-president and secretary-treasurer.

THE SEALDROK CORP., Columbus, O. Capital 250 shares common n.p.v. Incorporators, Robert J. Kuhn, Margaret Kuhn, and Doris L. Houltzer, Lima, O. Alonzo M. Snyder, president. Robert J. Kuhn, Lima, O., secretary. Organized to license persons using a new seal rock concrete in construction work.

Aggregates Statistics

FREIGHT originating on Class I railroads in the United States in 1929 amounted to 1,339,091,007 short tons and the total revenue derived from the haul thereof was $4,966,611,486. In 1933 the total freight, although slightly more than in 1932, amounted to only 698,942,511 short tons, and the total revenue was $2,578,984,504. These figures reveal a drop of 48 per cent. in the total tonnage of freight originated on Class I carriers and in freight revenue from 1929 to 1933, according to the Bureau of Mines.

Producers of crushed stone, sand and gravel, and slag depend on railroad purchases for a large part of their markets. In 1929 49,892,785 short tons of sand, gravel, and stone was sold to railroads for use as ballast, fill, or miscellaneous purposes. This quantity represented 16 per cent. of the total reported output of sand and gravel and crushed stone during that year. In 1933 railroad consumption was only 10,561,263 short tons, equivalent to 7 per cent. of the total output of sand and gravel and crushed stone. The sales of ballast and similar materials to railroads, therefore, declined 79 per cent. from 1929 to 1933, indicating that producers of sand, gravel, and stone supplying railroad markets have experienced a much sharper recession in volume of business than the carriers themselves.

Ballast Data Summarized.—Slag, cinders, chats, and burned clay are used locally as ballast but by far the bulk of the market is supplied by sand, gravel, and stone. The National Slag Assn. estimates that about 20,000,000 short tons of slag has been sold to the railroads during the past twenty years. No data covering the use of cinders, chats, or burned clay are available.

The first of the accompanying tables summarizes the statistics of sand, gravel, and crushed stone sold or used for ballast, fill, and miscellaneous railroad purposes from 1929 to 1933. The quantity of sand ballast is relatively small, accounting for only 5 per cent. of the total in both 1929 and 1933. Small quantities of sand also have been used for fill and similar purposes but separate figures for this material are not available.

Gravel comprises the largest part of ballast sales, 62 per cent. in 1929 and 51 per cent. in 1933. From 80 to 90 per cent. of the total gravel consumed by railroads is used directly as ballast, the rest is used for fill, grading around stations or loading platforms, construction, or other similar purposes. In 1929 41 per cent. of the gravel used expressly for ballast was produced by the railroads themselves; in 1933 only 27 per cent. was so reported.

Although the consumption of crushed stone as ballast has declined sharply since 1929, the drop has been less than for gravel. Crushed stone in 1929 comprised only 33 per cent. of the total of all materials but it accounted for 44 per cent. in 1933.

Value Per Ton.—For 5 years the value of ballast gravel produced by commercial producers has fluctuated only 3c. a ton from 41c. in 1932 to 44c. in 1930 and 1933. The average value of gravel used for miscellaneous purposes in 1933 was 58c. a ton. This sharp increase over previous years apparently was due to the inclusion of a large quantity of gravel to be used in construction. About 70 per cent. of the miscellaneous gravel reported in 1932 was used for fill and valued at only 8c. a ton; the value of the rest was comparable with that of the material produced in 1933.

The value of sand ballast dropped to 22c. and 19c. a ton, respectively, in 1931 and 1932 but jumped to 31c. in 1933. The value of crushed stone ballast varied only from 80c. to 83c. a ton from 1929 to 1932 but declined to 69c. in 1933. All these unit value represent net realization to the producers, f.o.b. plant or shipping point.

The railroads are asked to report the value of their output at the point of production. These returns have been consistently low, only 14c. a ton for ballast in 1932 and 20c. a ton in 1933. For the most part these values apparently represent the bare cost of loading the material on cars at the pit. Only about 2 per cent. of the gravel produced by the railroads is reported as washed or otherwise prepared.

Production by Railroads.—In 1932 and 1933 more than two thirds of the sand and gravel produced directly by railroads or by contractors expressly for their consumption was reported as railroad ballast. Engine sand, building gravel, and both sand and gravel for miscellaneous uses also were reported. These data are summarized in Table II.

Statistics of gravel ballast produced in 1932 and 1933 by railroads or by contractors expressly for their consumption are presented in Table III by regions established in the aggregate industry's code of fair competition. Combinations of certain regions have

(Continued on page 40)

Table II—SAND AND GRAVEL PRODUCED DIRECTLY BY RAILROADS OR BY CONTRACTORS EXPRESSLY FOR THEIR CONSUMPTION, BY USES, 1932-33

Use	1932			1933		
	Short Tons	Value		Short Tons	Value	
		Total	Per Ton		Total	Per Ton
Sand:						
Engine	70,059	$13,564	$0.19	65,565	$13,927	$0.21
Other	186,529	32,558	.17	221,244	40,271	.18
Gravel:						
Building	75,543	12,992	.17	19,165	20,666	1.08
Railroad ballast	2,140,154	293,328	.14	1,232,795	247,522	.20
Other	450,238	51,822	.12	259,434	29,711	.11
Total sand and gravel	2,922,523	404,264	.14	1,798,203	352,097	.20

Table I—SAND, GRAVEL, AND CRUSHED STONE SOLD OR USED FOR BALLAST, FILL, OR MISCELLANEOUS RAILROAD PURPOSES, 1929-33

Year	Sand Ballast [1]		Gravel Ballast										Crushed-Stone Ballast [2]		Grand Total	
			Produced by Railroads				Produced by Commercial Operations				Total Ballast, Fill and Miscellaneous					
			Ballast		Fill and Miscellaneous		Ballast		Fill and Miscellaneous							
	Short Tons	Value per Ton	Short Tons	Value per Ton	Short Tons	Value per Ton	Short Tons	Value per Ton	Short Tons	Valu per Ton	Short Tons	Value per Ton	Short Tons	Value per Ton	Short Tons	Value per Ton
1929	2,505,408	28c	11,202,714	18c	(3)	.....	16,129,815	42c	3,508,358	21c	30,840,887	31c	16,546,490	83c	49,892,785	48c
1930	1,971,788	29c	6,036,525	18c	(3)	.....	10,191,018	44c	4,485,389	27c	20,712,932	33c	12,817,800	80c	35,502,520	49c
1931	1,020,513	22c	3,379,804	16c	(3)	.....	5,435,103	43c	2,028,267	31c	10,843,174	33c	6,812,890	81c	18,676,577	50c
1932	995,783	19c	2,140,154	14c	450,238	12c	2,973,708	41c	1,080,383	24c	6,644,483	27c	3,974,540	82c	11,614,806	45c
1933	500,137	31c	1,232,795	20c	259,434	11c	3,435,802	44c	499,605	58c	5,427,636	38c	4,633,490	69c	10,561,263	51c

[1] Figures are not available for a small quantity of sand used for miscellaneous purposes.
[2] May include a small quantity of stone used for miscellaneous purposes.
[3] Included with production by commercial operations.

Foreign Developments

Reacting Aggregate Face Betters Concrete Strength

In an investigation to study the influence of the surface characteristics and the chemical composition of the aggregate on the strength of concrete, there were prepared three groups of mortar specimens, of which the first group contained aggregates with smooth surfaces, the second group with rough surfaces and the last group with puzzuolanic materials as aggregates, that is, materials whose exposed surfaces reacted with the binder. The most important result of the investigation is probably the determination that which the compressive strengths show scarcely any variation in connection with the use of aggregates of varying surface characteristics, the tensile strengths are considerably affected. A rough surface had a very favorable effect; still better a reacting surface, such as particularly cement clinker, by the use of which exceptionally high tensile strengths could be attained.—Dr. R. Grün in *Die Betonstrasse*, 1934, No. 4, pp. 51-55; *Tonindustrie - Zeitung* 58:672, July 9, 1934.

Aggregates (from page 39)

been necessary to avoid revealing production figures of individual railroads. Production of ballast by the railroads is confined largely to areas where facilities for the commercial production of gravel or crushed stone are limited or nonexistent. In 1932 78 per cent. of this material was reported from states west of Mississippi River. In 1933 New England accounted for 20 per cent. and the western group of states 68 per cent.

Forced to make drastic economies during the depression, the railroads apparently have limited their expenditures to bare necessities. Ballast purchases have shrunk accordingly, but increased consumption in the next few years probably will be necessary for maintenance of right-of-way.

Tests Cement's Activity at Surfaces of Rupture

The hydraulic activity of various cements after once hardening (in mortars) and being tested for tensile strength was studied by G. Baire (laboratory head of the Société des Ciments Francais) in an investigation reported in the September, 1934, *Revue des Materiaux de Construction et de Travaux Publics* (No. 300, pp. 249-251).

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Cements of different classes and from different sources were employed. After being broken in the tensile-strength tests the two fragments of the same briquet were put together in such a way that the two ruptured surfaces abutted as exactly as possible. No material, solid or liquid, was applied in the joint. The whole was wrapped to avoid any accidental displacement, and the briquette was immersed either in soft or in sea water. After a certain time (three months to a year) the briquette was again broken in the tensile-strength test, and was found to have more or less joined again.

The strengths ascertained in this second rupture were of course much less than in the original test, but still appreciable, varying from 0 to as high as 7 kg. per sq. cm. in two of the tests. The activity in general decreases with an increased interval between the mixing and the first rupture. An exception was in the case of puzzuolan cement and with unusually high clay content, where the increasing age of the specimen before the original rupture had comparatively little effect on the strength developed on rejoining.

The hydraulic activity increases slightly with an increased period between the two ruptures. It is in general greater for the cements of high early strength than for the Portlands.

Finds "Meta-Alite" Near Beta-Dicalcium-Silicate

Dr. Serban Solacolu (Bukharest, Rumania), writing in *Zement* for Oct. 4, 1934 (23:587-591), recalls that although to-day it is universally agreed that alite and tricalcium silicate are identical, it is not long since the existence of tricalcium silicate as a chemical compound was seriously disputed and alite identified as a solid solution between beta-dicalcium-silicate and calcium oxide. Furthermore, it is known that tricalcium silicate is stabile only in the range of 1,400 to 1,900 deg. C., and that it dissociates into beta-dicalcium-silicate and calcium oxide. Solacolu accordingly questioned whether there is not between these two dissociation products, under some conditions, a solid solution (mixed crystal formation), as Nacken and Dyckerhoff claimed.

Solacolu's experiments lead him to the conclusion that there is in fact, under certain special conditions, a solid solution between beta-dicalcium-silicate and calcium oxide. He designates it as meta-alite. It is a metastabile form and is described as an intermediary phase in the course of dissociation of alite. It is unstabile and CaO separates out as an end product.

Table III—GRAVEL BALLAST PRODUCED DIRECTLY BY RAILROADS OR BY CONTRACTORS EXPRESSLY FOR THEIR USE, BY REGIONS ESTABLISHED IN CODE OF FAIR COMPETITION, 1932-33 [1]

Regions [2]	1932			1933		
	Short Tons	Value Per Ton	Percentage of Total	Short Tons	Value Per Ton	Percentage of Total
1. Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut	93,764	27c	4.4	248,851	23c	20.2
2. New York 3. Pennsylvania, New Jersey, Delaware 4. West Virginia, Virginia, Maryland, District of Columbia	33,320	40c	1.6	21,112	41c	1.7
5. South Carolina, Georgia, Alabama, Florida, Mississippi 6 North Carolina, Kentucky, Tennessee	63,457	29c	3.0	46,458	15c	3.8
7. Arkansas, Louisiana, Texas	26,960	27c	1.3	162,980	28c	13.2
8. Ohio 9. Illinois, Indiana 10. Michigan, Wisconsin	283,658	12c	13.1	84,337	12c	6.8
11. North Dakota, South Dakota, Minnesota	450,775	12c	21.1	108,601	16c	8.8
12. Nebraska, Iowa 13. Kansas, Missouri, Oklahoma	306,206	15c	14.3	198,791	19c	16.1
14. Wyoming, Colorado, New Mexico, Utah, Arizona	73,026	5c	3.4	138,583	26c	11.3
15. California, Nevada	135,196	11c	6.3	129,892	13c	10.5
16. Montana, Washington, Oregon, Idaho	673,792	12c	31.5	93,190	11c	7.6
Total United States	2,140,154	14c	100.0	1,232,795	20c	100.0

[1] Among the railroads reporting large tonnages are the Atchison, Topeka & Santa Fe; Bangor & Aroostook; Boston, Maine; Central of Georgia; Chicago, Burlington & Quincy; Chicago Great Western; Chicago, Milwaukee, St. Paul, and Pacific; Chicago & Northwestern; Chicago, Rock Island & Pacific; Delaware & Hudson; Fort Worth & Rio Grande; Great Northern; Illinois Central; Kansas City Southern; Los Angeles & Salt Lake; Minneapolis, St. Paul & Sault Ste. Marie; Norfolk Southern; Northern Pacific; Oregon Short Line; Oregon-Washington Railroad & Navigation Co.; Richmond, Fredericksburg & Potomac; Rutland; San Antonio, Uvalde & Gulf; Southern Pacific; and Union Pacific.

[2] Combinations of certain regions are necessary to avoid revealing confidential figures.

Latest Portland-Cement Statistics

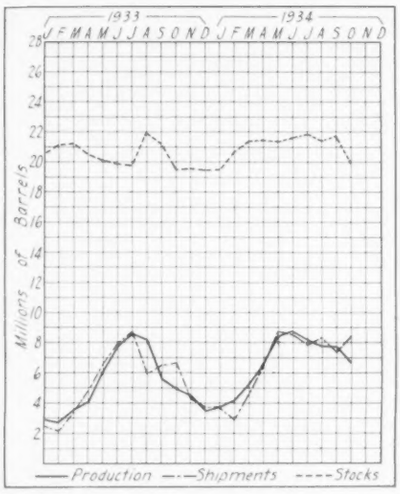


Chart showing monthly production, shipments and stocks on hand at end of month from January, 1933, to October, 1934.

THE Portland-cement industry in October, 1934, produced 6,675,000 bbl., shipped 8,439,000 bbl. from the mills, and had in stock at the end of the month 19,969,000 bbl. Production in October, 1934, showed an increase of 32.5 per cent. and shipments an increase of 25.0 per cent., as compared with October, 1933. Stocks at the mills were 2.4 per cent. larger than a year ago. The mill value of the shipments —58,700,000 bbl.—in the first nine months of 1934 is estimated as $89,521,000.

These statistics are compiled from reports received by the Bureau of Mines from all manufacturing plants except one, for which an estimate has been included in lieu of actual returns.

In the following statement the total output of finished cement is compared with the estimated capacity of 162 plants at the close of October, 1934, and of 163 plants at the close of October, 1933.

RATIO (*per cent.*) OF PRODUCTION TO CAPACITY

	October		Sept.	Aug.	July
	1933	1934	1934	1934	1934
The month..	22.1	29.3	34.8	34.5	35.7
The 12 monthsended	24.5	28.3	27.6	26.8	26.9

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1933 AND 1934 (*in thousands of barrels*)

Month	Production		Shipments		Stocks At End of Month	
	1933	1934	1933	1934	1933	1934
January	2,958	3,779	2,502	3,778	20,624	19,547
February	2,777	4,168	2,278	2,952	21,125	20,762
March	3,684	5,257	3,510	4,618	21,298	21,422
April	4,183	6,544	4,949	6,492	20,542	21,557
May	6,262	8,554	6,709	8,784	20,117	21,301
June	7,804	8,786	7,979	a8,541	19,936	21,600
July	8,609	8,134	8,697	a7,898	19,848	21,852
August	8,223	7,863	5,994	a8,249	22,078	21,424
September	5,638	7,680	6,517	7,388	21,216	a21,734
October	5,037	6,675	6,750	8,439	19,502	19,969
November	4,672	.....	4,463	.....	19,709	.....
December	3,526	.....	3,738	.....	a19,541	.....
Totals...	63,373	.....	64,086	.....	.....	.....

a Revised.

DISTRIBUTION OF CEMENT (*a*)

Shipped to—	August		September		Shipped to—	August		September	
	1933	1934	1933	1934		1933	1934	1933	1934
Alabama	43,833	58,083	37,662	101,797	New Jersey	136,598	296,701	208,873	234,858
Alaska	1,153	1,830	870	1,333	New Mexico	10,334	29,547	10,141	26,948
Arizona	7,173	18,525	9,568	16,783	New York	671,520	1,046,116	755,060	871,477
Arkansas	37,875	54,408	36,334	44,904	North Carolina	28,750	80,785	38,023	57,349
California	467,953	465,329	465,552	366,711	North Dakota	8,634	30,352	15,346	23,947
Colorado	62,639	54,310	59,528	39,342	Ohio	224,994	387,150	252,557	378,580
Connecticut	52,886	100,394	64,110	74,140	Oklahoma	65,182	116,089	75,504	90,398
Delaware	3,729	34,295	24,153	18,774	Oregon	29,112	56,553	27,519	46,140
Dist. of Col.	92,921	103,254	82,678	79,636	Pennsylvania	365,210	588,029	390,921	532,640
Florida	40,668	68,860	33,952	64,110	Porto Rico	7,088	28,739	12,125	18,094
Georgia	29,751	100,561	27,079	85,117	Rhode Island	11,673	35,258	19,214	26,513
Hawaii	9,728	9,172	13,299	21,081	South Carolina	10,640	36,758	11,846	24,579
Idaho	12,859	19,775	15,348	21,414	South Dakota	11,546	77,908	28,590	61,947
Illinois	996,408	545,571	881,269	546,923	Tennessee	39,283	158,610	42,073	124,708
Indiana	238,572	280,620	218,104	222,833	Texas	210,589	273,028	189,125	256,306
Iowa	142,845	250,414	223,434	228,125	Utah	38,615	22,408	41,750	24,600
Kansas	60,913	93,270	56,824	81,170	Vermont	12,785	35,735	20,088	23,969
Kentucky	135,378	140,881	122,957	124,073	Virginia	56,154	140,236	61,636	106,690
Louisiana	28,325	91,485	46,683	69,826	Washington	84,254	116,244	84,053	93,233
Maine	35,521	34,026	26,523	28,336	West Virginia	49,891	114,309	60,768	192,073
Maryland	74,145	141,347	84,291	122,026	Wisconsin	176,011	347,459	256,521	238,421
Massachusetts	121,269	267,319	176,491	245,802	Wyoming	5,924	23,461	7,619	22,976
Michigan	287,724	342,974	294,624	303,850	Unspecified	0	6,601	8,680	64,788
Minnesota	137,415	243,654	231,437	273,902		5,928,970	8,201,591	6,487,113	7,360,805
Mississippi	60,345	24,962	67,327	47,836	Foreign countries	65,030	35,409	29,887	27,195
Missouri	230,012	210,729	229,929	178,361					
Montana	12,275	30,700	15,255	24,566					
Nebraska	33,921	101,600	86,104	83,866	Total shipped from cement plants	5,994,000	8,237,000	6,517,000	7,388,000
Nevada	184,288	224,548	210,456	265,840					
New Hampshire	31,659	40,489	27,240	37,094					

a Includes estimated distribution from 3 plants in August and September, 1933; from 1 plant in August, 1934; from 1 plant in September, 1934.

Bureau of Mines Paper Treats Gravel Digging

Factors affecting the technical problems involved in sand-and-gravel excavation are presented in a circular by J. R. Thoenen, senior mining engineer, just issued by the U. S. Bureau of Mines, Department of the Interior. The circular, designated as Part I, is the first of a series analyzing technical problems involved in the use of different types of excavating equipment as applied to sand and gravel deposits of various physical characteristics.

The discussion in Part I is confined to a general statement of the factors affecting excavation in deposits of different type and the use of the power shovel, dragline, and excavator crane. Parts II and III to follow will discuss other types of equipment.

The circular deals with each excavating unit on the basis of its operating characteristics, working range, structural limitations, service equipment required and range of theoretical and actual working capacity. Working ranges and capacities are given in the text and condensed in tabular form for easy reference. The difference between theoretical and working capacities are emphasized and methods of calculations from easily ascertained data are explained.

New York Cement Plants Hold Safety Exposition

A three-day safety exposition sponsored by the Universal Atlas Cement Co. and the Lone Star Cement Co., New York, was recently held in the City Hall at Hudson, N. Y. Approximately 5,500 people, including 3,000 school children, attended the sessions and the exhibit. Safety talks were given by state and company officials and posters, bulletins and moving pictures comprised the exhibits. State officials praised Gunnar Hummel of Lone Star and former Mayor Michael J. Degnan of Universal Atlas for their efforts in putting over this successful exposition.

The New Enterprise Stone & Lime Co., Everett, Pa., recently purchased the Ashcom stone quarry and plant from the Everett-Saxton Co. of Philadelphia, and operations were begun on October 1. The New Enterprise company also owns limestone quarries at Roaring Spring and Waterside, Pa., and a sand bank at Everett.

Lime Shipments

LIME shipments in September returned approximately to the July level by reaching 116,919 tons (Table I). Of this total agricultural lime accounted for 13,430 tons (or 11.4 per cent.), building lime for 21,522 tons (or 18.4 per cent.) and chemical lime for 81,967 tons (or 70.1 per cent.). The chemical uses of lime continue to absorb the major part of the total lime output.

Compared with the August record the September shipments disclose a decline in all types of lime. Agricultural-lime shipments fell 28.5 per cent. (from 18,794 to 13,430 tons), building-lime shipments 18.5 per cent. (from 26,418 to 21,522 tons), and chemical-lime shipments 1.8 per cent. (from 83,538 to 81,967 tons.). Monthly chemical-lime shipments showed little variation throughout the third quarter. Building-lime shipments showed a similar steadiness from April to August inclusive.

Prices exhibited a slight weakening in September as compared with August figures (Table II). This is true of individual prices as well as of averages. The average price of agricultural lime declined from $8.32 to $8.01, that of chemical lime from $6.88 to $6.83, and that of all lime from $7.86 to $7.70. Building lime was the sole exception, its price having risen from $10.64 to $10.85.

Table I.—SHIPMENTS OF LIME IN 1934, BY KINDS AND USES (*tons*)

Month	Kinds[1]	Uses			Totals
		Agriculture	Building	Chemical	
February	Quicklime	601	5,384	75,561	81,546
	Hydrate	2,435	7,238[2]	19,715	29,388
	Totals	3,036	12,622	95,276	110,934
March	Quicklime	2,541	9,538	85,918	97,997
	Hydrate	9,695	10,570[2]	24,152	44,417
	Totals	12,236	20,108	110,070	142,414
April	Quicklime	5,945	12,531	75,187	93,663
	Hydrate	26,990	14,476[2]	20,722	62,188
	Totals	32,935	27,007	95,909	155,851
May	Quicklime	5,184	11,569	86,807	103,560
	Hydrate	26,392	14,560[2]	22,503	63,455
	Totals	31,576	26,129	109,310	167,015
June	Quicklime	1,555	11,314	71,170	84,039
	Hydrate	12,444	14,694	23,359	50,497
	Totals	13,999	26,008	94,529	134,536
July	Quicklime	855	10,422	63,713	74,990
	Hydrate	7,296	13,804	20,895	41,995
	Totals	8,151	24,226	84,608	116,985
August	Quicklime	4,683	12,151	63,809	80,643
	Hydrate	14,111	14,267	19,729	48,107
	Totals	18,794	26,418	83,538	128,750
September	Quicklime	3,126	10,052	61,156	74,334
	Hydrate	10,304	11,470	20,811	42,585
	Totals	13,430	21,522	61,156	116,919

[1] Do not include the following miscellaneous lime: January, 725 tons; February, 572 tons; March, 1,285 tons; April, 3,136 tons; May, 3,595 tons; June, 2,915 tons; July, 2,275 tons; August, 4,075 tons; September 3,699 tons.
[2] Does not include finishing lime.

SHIPMENTS OF LIME IN SEPTEMBER, 1934, BY KINDS AND USES

Kinds	Agriculture		Building		Chemical		Total	
	Tons	Per Ton	Tons	Per Ton	Tons	Per Ton	Tons	Per Ton
Quicklime:								
In bulk	1,746	$4.69	2,832	$8.19	56,481	$6.14	61,059	$6.19
In barrels	108	16.63	3,575	17.13	1,052	16.47	4,735	16.98
In bags	1,272	8.89	3,645	12.51	3,623	7.51	8,540	9.85
Hydrate	10,304	8.38	11,470	9.03	20,811	8.09	42,585	8.41
Totals or averages	13,430	$8.01	21,522	$10.85	81,967	$6.83	116,919	$7.70

[1] Do not include 3,699 tons of miscellaneous lime. [2] Does not include finishing lime.

During September the prices of quicklime shipped in bulk ranged from $4.69 a ton for agricultural lime (which sold at $5.16 in August), through $6.14 for chemical lime ($6.13 in August), to $8.19 for building lime ($7.97 in August). Those of quicklime shipped in barrels ranged from $16.47 for chemical lime ($14.51 in August), through $16.63 for agricultural ($18.01 in August), to $17.13 for building ($16.88 in August). The average price of quicklime shipped in bags in September was $7.51 for chemical lime ($8.88 in August), $8.89 for agricultural ($9.07 in August), and $12.51 for building ($12.51 in August). Hydrate prices averaged $8.09 a ton in September for chemical lime ($8.83 in August), $8.38 for agricultural ($8.58 in August), and $9.03 for building ($9.13 in August).

The ratio of shipments to capacity

(*Continued on page 44*)

Table III.—SHIPMENTS AND VALUE OF LIME AND RATIO OF SHIPMENTS TO CAPACITY IN 1933 AND 1934, BY MONTHS

Month	Total Capacity of Concerns Reporting[1] (*tons*)	Shipments Reported (*tons*)	Average Value Per Ton	Ratio of Shipments to Capacity (*per cent.*)												
				United States	Districts											
					1	2	3	4	5B	6-8-9	7	10-11	12	13	14	15
1933																
October	347,446	109,818	$6.84	31.6	15.6	26.1	48.6	32.5	26.1	20.9	46.6	35.5	29.7	21.8	38.2	17.9
November	392,947	100,596	7.01	25.6	15.1	20.0	32.0	22.3	24.2	18.5	37.6	34.4	22.2	26.3	23.2	18.4
December	390,553	107,860	6.72	27.6	17.7	16.3	40.0	21.1	27.9	15.2	41.1	33.8	25.9	22.9	20.3	19.6
1934																
January	392,636	112,437	7.31	28.6	12.2	19.4	39.6	26.3	33.0	23.8	38.1	43.0	36.1	23.4	17.4	17.1
February	406,215	111,506	7.17	27.4	9.7	19.3	35.7	25.5	38.4	18.3	35.9	37.2	42.9	25.5	26.2	18.5
March	392,806	143,699	7.50	36.5	15.5	35.1	47.8	40.4	31.7	25.3	48.2	40.3	49.4	24.7	52.4	26.4
April	391,860	158,987	7.66	40.5	24.4	55.4	53.0	50.7	38.9	29.2	43.7	39.1	44.9	26.5	24.8	20.4
May	397,365	170,610	7.68	42.9	26.9	53.6	62.8	49.4	37.3	28.7	49.8	46.7	36.8	28.7	25.1	23.0
June	396,174	137,451	7.88	34.6	23.8	32.1	49.0	46.3	30.4	25.5	45.4	32.7	34.1	30.4	31.3	18.6
July	409,330	119,259	7.79	29.1	21.1	25.8	34.8	39.8	25.3	24.1	42.1	30.4	32.3	23.4	22.7	19.4
August	404,429	132,825	7.82	32.8	19.0	41.6	39.5	40.7	30.1	28.6	43.1	32.5	32.0	25.4	24.2	21.1
September	401,039	120,618	7.67	30.0	18.2	30.6	36.6	34.6	26.9	23.3	43.1	29.8	24.3	21.5	14.8	19.9

[1] Idle capacity reported as follows: October, 27,414 tons; November, 18,673 tons; December, 12,679 tons; January, 12,687 tons; February, 14,150 tons; March 7,313, tons; April, 3,564 tons; May, 6,397 tons; June, 7,152 tons; July, 14,937 tons; August, 8,699 tons; September, 8,140 tons.

Labor Conditions

THE seasonal decline in employment in the nonmetallic-mineral industries continued in October, according to preliminary figures. August and September figures, the latest complete data available since the publication of the last report—PIT AND QUARRY, November, 1934, pp. 44-45—are given in the accompanying tables.

Quarrying Industry. — In October 1,118 quarries reported the employment of 34,149 workers, the employment index (based on the 1923 to 1925, 3-yr. average taken as 100) being 51.8. The corresponding figures for September were 1,140 establishments employing 35,569 workers, the index of employment being 53.3 In August 1,122 quarries reported 36,151 employees, the index being 54.7 (Table I).

The August employment index (54.7) was 1.5 per cent. below July's (55.6) but 6.0 per cent, above that of August, 1933. The September index (53.3) was 2.6 per cent. under August's, but 1.3 per cent. over that of September a year ago. The index for October (51.8) was 2.9 per cent. below September's and 2.6 per cent. below a year previous.

One-week pay-rolls (Table I) declined in October to $542,831, giving a pay-roll index of 32.1. The August index (34.0) was 2.8 per cent. below that of July (35.0) but 13.7 per cent. above August of 1933. The September figure (32.4) was 4.8 per cent. under August's but 10.6 per cent. above a year previous. The October index shows a loss of .8 per cent. when compared with that of September and a gain of 2.9 per cent. when compared with a year ago.

Per-capita weekly earnings fell to $15.65 in September, a drop of 2.3 per cent. from August but a rise of 9.2 per cent. for the year (Table I). In August the figure was $16.05, which was 1.4 per cent. below July's, but 7.4 per cent. higher than the previous August.

The average number of hours worked per week (Table I) was 33.0 in September and 33.7 in August. The July-to-August decline was .6 per cent., the August-to-September drop 2.9 per cent. The decline from a year ago was 11.3 per cent. in August and 3.0 per cent. in September.

Average hourly earnings, which were 48.6c. in July, fell to 47.9c. in August and 47.8c. in September (Table I). These figures show a month-to-month loss of 1.0 per cent. in August and .8 per cent. in September, and a year-to-year gain of 20.3 per cent. in August and 13.1 per cent. in September.

Comparisons of employment and pay-rolls in 1,138 quarries in August and September are shown in Table II. Increases in employment occurred in 11 states, the gains ranging from .6 per cent. in Georgia to 70.8 per cent. in Utah. The increase in Maine was 24.0 per cent. and in Wisconsin 20.4 per cent. The decreases reached 45.0 per cent. in Montana, 33.3 per cent. in Nebraska, 32.4 per cent. in Colorado, 32.1 per cent. in Oregon, and 28.9 per cent. in South Dakota. The general trend was naturally in agreement with the data presented in Table I.

Pay-roll increases were reported in 10 states, the increases ranging from .9 per cent. in Georgia to 31.2 per cent. in Utah. In Texas the gain was 27.5 per cent. and in Mississippi 26.5 per cent. New York showed pay-roll gains despite employment losses and the

Table I.—EMPLOYMENT, PAY-ROLLS AND EARNINGS IN THE QUARRYING AND NONMETALLIC-MINING INDUSTRIES, IN 1933 AND 1934, BY MONTHS

(Gains are shown in bold-faced type, losses in light-faced type)

Month	Establishments Reporting	Employment				Pay-Rolls				Per-Capita Weekly Earnings			Average Hours Worked per Week			Average Hourly Earnings		
		Employees on Pay-Rolls	Index of Employment[1]	Percentage Change From—		Amount of Pay-Rolls (1 week)	Index of Pay-Rolls[1]	Percentage Change From—		Average for Month	Percentage Change From—		Average for Month	Percentage Change From—		Average for Month	Percentage Change From—	
				Preceding Month	Year Ago			Preceding Month	Year Ago		Preceding Month	Year Ago		Preceding Month	Year Ago		Preceding Month	Year Ago
1933																		
October	1,202	36,894	53.2	**1.1**	**1.5**	$566,803	31.2	**6.4**	**3.7**	$15.36	**5.2**	**2.1**	34.8	**1.4**	.....	44.7c.	**3.5**	.....
November	1,185	34,303	51.1	3.9	**3.4**	497,238	28.3	9.3	**4.4**	14.50	5.5	**.9**	32.5	6.6	.....	45.2c.	**1.1**	.....
December	1,162	30,658	45.3	11.3	**7.1**	434,751	24.4	13.7	**10.4**	14.18	2.7	**3.3**	31.3	3.7	.....	46.1c.	**.9**	.....
1934																		
January	1,144	26,217	39.7	12.5	**13.1**	368,224	21.3	12.6	**17.7**	14.05	.1	**4.1**	30.8	1.9	.....	45.6c.	**.2**	.....
February	1,192	26,561	38.8	2.2	**11.5**	374,577	21.0	1.5	**20.7**	14.10	.7	**8.2**	31.1	**1.3**	.....	45.4c.	[2]	.....
March	1,180	28,610	42.0	**8.3**	**19.7**	434,572	24.1	**14.8**	**35.4**	15.19	**5.9**	**13.2**	33.5	**6.3**	2.7	45.6c.	**.7**	**17.7**
April	1,186	**32,629**	48.7	**15.9**	**23.9**	522,154	29.9	**23.9**	**48.0**	16.00	**6.9**	**19.5**	34.2	**4.0**	4.3	46.9c.	**2.6**	**27.1**
May	1,148	36,111	54.3	**11.4**	**25.1**	615,248	35.0	**17.3**	**47.1**	17.04	**5.3**	**17.7**	36.0	**4.0**	8.0	47.5c.	**.8**	**30.1**
June	1,149	**38,250**	56.6	**4.4**	**19.7**	648,890	37.0	**5.5**	**34.5**	16.96	**1.1**	**12.6**	35.8	**1.4**	11.9	48.0c.	**.8**	**30.1**
July	1,087	34,830	55.6	1.9	**12.3**	568,501	35.0	5.4	**23.2**	16.32	3.6	**9.6**	34.0	5.0	17.0	48.6c.	**1.3**	**32.4**
August	1,122	36,151	54.7	1.5	**6.0**	580,114	34.0	2.8	**13.7**	16.05	1.4	**7.4**	33.7	.6	11.3	47.9c.	**1.0**	**20.3**
September	1,140	35,569	53.3	2.6	**1.3**	556,778	32.4	4.8	**10.6**	15.65	2.3	**9.2**	33.0	2.9	3.0	47.8c.	**.8**	**13.1**
October	1,118	34,149	51.8	2.9	**2.6**	542,831	32.1	.8	**2.9**	.....	.....	.....	.....	.....	.....	.....	.....	.....

[1] Before March 1, 1934, the index numbers were based on 1926 = 100; since then they have been based on the 3-yr. average, 1923 to 1925, as 100.
[2] No change.

Table III.—CHANGES IN WAGE RATES IN THE QUARRYING AND NONMETALLIC-MINING INDUSTRIES, IN 1933 AND 1934, BY MONTHS

Month Ended	Establishments Reporting	Employees	No Change		Increases		Decreases	
			Establishments	Employees	Establishments	Employees	Establishments	Employees
Aug. 15	1,142	34,553	1,033	29,638	109	4,915	.....	.....
Sep. 15	1,152	35,442	1,059	32,390	93	3,052	.....	.....
Oct. 15	1,202	36,894	1,179	35,305	21	1,516	2	73
Nov. 15	1,185	34,303	1,178	34,132	7	171	.....	.....
Dec. 15	1,162	30,658	1,149	30,431	12	214	1	13
Jan. 15	1,144	26,251	1,138	26,149	6	68	.....	.....
Feb. 15	1,192	26,561	1,189	26,536	3	25	.....	.....
Mar. 15	1,180	28,610	1,179	28,550	1	60	.....	.....
Apr. 15	1,186	32,629	1,166	31,007	20	1,622	.....	.....
May 15	1,148	36,111	1,123	33,616	25	2,495	.....	.....
June 15	1,149	38,250	1,139	37,838	10	412	.....	.....
July 15	1,087	34,830	1,078	34,786	9	44	.....	.....
Aug. 15	1,122	36,151	1,121	36,071	1	80	.....	.....

Table V.—CHANGES IN WAGE RATES IN THE CEMENT INDUSTRY, IN 1933 AND 1934, BY MONTHS

Month Ended	Establishments Reporting	Number of Employees	No Change		Increases		Decreases	
			Establishments	Employees	Establishments	Employees	Establishments	Employees
Aug. 15	111	15,787	60	5,081	51	10,706	.....	.....
Sep. 15	129	15,545	126	15,451	3	94	.....	.....
Oct. 15	131	13,199	128	12,609	3	510	.....	.....
Nov. 15	113	10,071	113	10,071	.....	.....	.....	.....
Dec. 15	129	10,851	129	10,851	.....	.....	.....	.....
Jan. 15	121	9,495	121	9,495	.....	.....	.....	.....
Feb. 15	125	12,745	125	12,745	.....	.....	.....	.....
Mar. 15	120	13,023	120	13,023	.....	.....	.....	.....
Apr. 15	119	12,414	96	7,694	23	4,720	.....	.....
May 15	122	17,593	115	16,372	7	1,221	.....	.....
June 15	131	19,495	119	17,259	12	2,200	.....	.....
July 15	129	19,158	127	19,026	2	132	.....	.....
Aug. 15	123	16,920	122	16,814	1	106	.....	.....

same is true of Vermont. In Mississippi the pay-rolls increase (26.5 per cent.) was more than five times as great as the gain in employment (4.9 per cent.). In Texas the pay-roll gain was 27.5 per cent., while employment declined 15.4 per cent.

In the month ended August 15, the latest period for which statistics are available, one concern raised the wages of 80 workers (Table III). The steady decline in the number of such cases and in the number of workers affected seems to indicate that wages had been fairly well stabilized in accordance with the adjustments made necessary by code provisions.

Cement Industry. — Reports from 116 cement plants indicate that 15,849 workers were employed in October (Table IV). The employment index, which stood at 51.0, was 5.5 per cent. below September's but 15.9 per cent. above that of a year previous. The September figure (54.0) was 1.8 per cent. under the August index but 12.5 higher than in 1933. The August figure (55.0) showed a loss of 5.8 per cent. from July but a gain of 3.6 per cent. for the year.

One-week pay-rolls in October were $300,974—index 33.1—a loss of 2.3 per cent. for the month, but a gain of 34.0 per cent. for the year. The July-to-August loss was 9.6 per cent. and that for August to September 4.2 per cent. The year's gains were 10.6 per cent. for August and 31.4 per cent. for September.

Per-capita weekly earnings fell from $20.20 in July, to $19.14 in August and to $19.05 in September, a loss of 2.5 per cent. in September compared with August and a gain of 16.2 per cent. compared with September, 1933. The average number of hours worked per week declined to 32.9 in September, a month's loss of 1.2 per cent. and a year's gain of 6.3 per cent. Average hourly earnings dropped to 57.2c., which, although .2 per cent. lower than the August figure, was 10.2 per cent. above that of a year previous. It was also, with the exception of the August record of 57.8c., the highest figure in more than a year.

In October, 1 cement plant raised the wages of 106 workers (Table V).

Table II.—COMPARISON OF EMPLOYMENT AND PAY-ROLLS IN IDENTICAL QUARRY AND NONMETALLIC-MINING ESTABLISHMENTS, IN AUGUST AND SEPTEMBER, 1934, BY STATES

(Gains are shown in bold-faced type, losses in light-faced type)

State	Number of Establishments	Number on Pay-Roll, September, 1934	Percentage Change from August, 1934	Amount of Pay-Roll (1 week) September, 1934	Percentage Change from August, 1934
Alabama	16	664	6.7	$8,156	4.7
Arizona	3	40	9.1	458	24.8
Arkansas	8	209	7.1	2,573	16.7
California	43	1,107	8.2	19,539	13.1
Colorado	5	23	32.4	310	42.7
Connecticut	25	336	**1.8**	5,632	16.6
Delaware	3	72	2.7	1,255	15.6
Dist. of Columbia					
Florida	18	968	6.2	11,525	8.8
Georgia	24	1,471	**.6**	14,509	**.9**
Idaho					
Illinois	23	663	3.9	10,838	11.2
Indiana	73	1,551	9.1	23,802	12.0
Iowa	26	492	**3.8**	7,983	**1.7**
Kansas	36	1,305	3.1	26,983	.5
Kentucky	41	1,361	10.5	14,502	3.7
Louisiana	7	654	7.6	8,654	8.9
Maine	11	558	**24.0**	11,537	**6.4**
Maryland	8	240	11.1	3,573	11.7
Massachusetts	19	504	**2.6**	10,833	1.2
Michigan	45	1,722	5.5	29,636	11.4
Minnesota	23	346	**.9**	5,393	**4.6**
Mississippi	10	213	**4.9**	2,861	**26.5**
Missouri	52	1,117	6.6	15,398	5.2
Montana	8	71	45.0	1,220	36.0
Nebraska	11	180	33.3	2,108	38.9
Nevada					
New Hampshire	10	284	6.9	7,946	8.9
New Jersey	34	560	.7	10,784	3.2
New Mexico					
New York	79	2,594	.1	54,672	**5.8**
North Carolina	14	429	6.7	5,717	9.6
North Dakota					
Ohio	113	3,323	4.0	48,261	11.5
Oklahoma	16	159	11.2	1,672	4.4
Oregon	3	53	32.1	734	52.7
Pennsylvania	153	5,514	2.4	79,003	11.4
Rhode Island					
South Carolina	5	189	10.4	2,007	18.8
South Dakota	6	59	28.9	820	40.6
Tennessee	23	763	**8.1**	8,457	**16.1**
Texas	22	1,110	15.4	26,517	**27.5**
Utah	7	164	**70.8**	2,201	**31.2**
Vermont	37	1,934	1.9	39,440	**3.6**
Virginia	32	1,219	4.1	13,725	10.7
Washington	12	389	**7.8**	6,795	3.8
West Virginia	22	885	2.0	9,926	20.9
Wisconsin	12	319	**20.4**	4,768	**3.2**
Wyoming					
Totals	1,138	35,814		562,818	

Lime (from page 42)

for the entire country fell to 30.0 per cent., and ranged from 18.2 in District 1 (New England and eastern New York) to 43.1 in District 7 (Illinois, Indiana and eastern Missouri).

Table IV.—EMPLOYMENT, PAY-ROLLS AND EARNINGS IN THE CEMENT INDUSTRY, IN 1933 AND 1934, BY MONTHS

(Gains are shown in bold-faced type, losses in light-faced type)

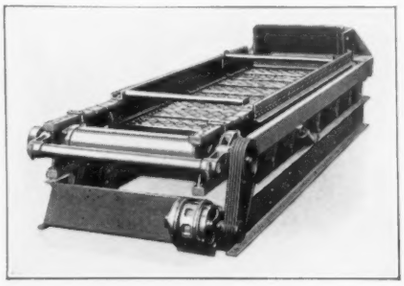
Month	Establishments Reporting	Employment				Pay-Rolls				Per-Capita Weekly Earnings			Average Hours Worked per Week			Average Hourly Earnings		
		Employees on Pay-Rolls	Index of Employment[1]	Percentage Change From—		Amount of Pay-Rolls (1 week)	Index of Pay-Rolls[1]	Percentage Change From—		Average for Month	Percentage Change From—		Average for Month	Percentage Change From—		Average for Month	Percentage Change From—	
				Preceding Month	Year Ago			Preceding Month	Year Ago		Preceding Month	Year Ago		Preceding Month	Year Ago		Preceding Month	Year Ago
1933																		
October	131	13,119	38.0	13.7	11.4	$240,984	22.9	4.5	9.1	$18.37	**10.7**	**2.1**	34.5	**8.4**	.....	54.3c.	**4.0**	.....
November	113	10,071	37.8	.4	7.8	177,760	21.2	7.1	8.6	17.65	6.7	.8	32.0	7.2	.....	52.8c.	2.7	.....
December	129	10,851	33.6	11.3	**2.1**	172,067	17.6	17.1	**2.3**	15.86	6.6	**.2**	28.5	10.9	.....	54.2c.	**2.6**	.....
1934																		
January	121	9,495	32.6	2.8	**8.7**	164,507	17.9	**1.7**	**19.3**	17.33	**4.6**	**9.3**	31.4	**7.9**	.....	55.7c.	1.1	.....
February	125	12,745	37.6	**15.2**	**26.6**	212,111	20.8	**16.2**	**39.6**	16.64	**.8**	**10.2**	30.8	**4.1**	.....	53.1c.	1.7	.....
March	120	13,023	42.4	**3.4**	**30.1**	224,218	24.1	**7.0**	**46.1**	17.22	**3.5**	**11.7**	31.9	**4.6**	10.6	53.6c.	**.2**	**29.9**
April	119	12,414	48.0	**13.3**	**24.0**	245,774	30.6	**27.0**	**65.4**	19.80	**12.1**	**33.3**	35.3	**7.6**	**3.6**	55.5c.	**3.7**	**33.3**
May	122	17,593	57.6	**20.0**	**42.2**	332,867	35.8	**17.1**	**68.1**	18.92	2.4	**18.3**	33.2	3.5	13.0	56.8c.	**2.2**	**39.0**
June	131	19,459	59.1	**2.6**	**27.1**	395,590	39.9	**11.4**	**57.7**	20.33	**8.5**	**23.9**	35.6	**8.9**	8.0	56.4c.	.9	**39.1**
July	129	19,158	58.4	1.2	**16.3**	387,041	39.1	1.9	**40.6**	20.20	.8	**20.7**	34.7	2.3	8.7	57.1c.	**.7**	**35.4**
August	123	16,920	55.0	5.8	**3.6**	323,831	35.4	9.6	**10.6**	19.14	.4	**6.6**	33.0	5.2	5.9	57.8c.	**1.4**	**15.7**
September	122	16,799	54.0	1.8	**12.5**	320,082	33.9	4.2	**31.4**	19.05	2.5	**16.2**	32.9	1.2	**6.3**	57.2c.	.2	**10.2**
October	116	15,849	51.0	5.5	**15.9**	300,874	33.1	2.3	**34.0**	.....	.....	.....	.....	.....	.....	.....	.....	.....

[1] Before March 1, 1934, the index numbers are based on 1926 = 100; since then they have been based on the 3-yr. average, 1923 to 1925, as 100.

New Machinery and Supplies

New Full-Floating Vibrating Screen Has Horizontal Decks

The Symons screen, recently announced by the Nordberg Manufacturing Co., Milwaukee, Wis., is of full floating design and lies flat. It is not necessary to incline it in order to obtain a movement of material along the deck. This is accomplished because of its unusual action, which is a combination of conveying and screening. The action is such that the material is lifted and actually moved forward a definite distance with each movement of the



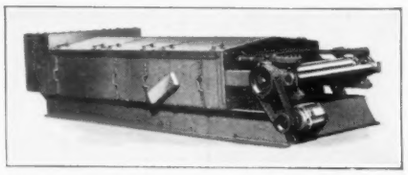
Full floating vibrating screen with motor and drive in foreground.

eccentric and the entire screen area has the same movement.

The screen has a heavy channel base to which are attached two sets of flexible inclined supports; one for the screen deck, the other for the side bars or balance deck which counterbalances the screen deck. The weight of the screen decks is not carried on the bearings but on these supports.

The screen is actuated from the drive unit located at the discharge end and this too is carried by means of four similar flexible supports, these being placed in a horizontal position. All moving parts are therefore carried on flexible supports, which prevent vibration being carried to building or screen supports. This freedom from vibration is further attained from the counterbalancing effect of the decks, since for each set of forces acting in one direction there is a balancing set acting in the opposite direction. With the screen set flat, less headroom is needed and with no bouncing or cascading of material along the deck close grading is accomplished.

The drive unit is equipped with antifriction bearings and is enclosed against dust. For screening of hot, dusty materials, this screen lends itself easily to complete enclosure and with the operating mechanism and motor outside of housing and away from the dust and heat. The screen cloth is set in readily removable panels. The cloth is not stretched resulting in longer screen life which is further enhanced due to the fact that the screen cloth in coming in contact with the moving



Horizontal vibrating screen enclosed with dust housing.

material is always moving in the same direction that this material is moving. This eliminates abrasive action and unnecessary wear on the screen cloth. A feed hopper is provided which is located on the side bars and vibrates with them providing an automatic feed which spreads the material evenly over the entire deck area. Symons screens are built with single, double and triple decks and in lengths up to 20 feet.

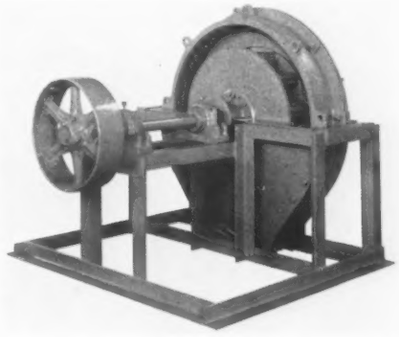
Elastic Cable Designed For Blast Hole and Well Drills

Macwhyte Company, Kenosha, Wis., announces a new "Hi-Lastic" spudder line made of mild plow steel for use in water well and blast hole drilling. This new spudder line has three times the stretch of standard drilling line and has been used successfully in wells running between 500 and 1,000 feet deep. While Hi-Lastic spudder lines do not have as much spring as manila rope, the manufacturer claims they have enough spring to do the work quickly and efficiently as manila, and they have the advantage of withstanding greater abrasion, thus giving longer and better service. Their stretch permits use without splicing a manila cracker on the end. Hi-Lastic is 6-strand left lay construction, with 19 wires to the strand. It comes in 2 sizes: $\frac{5}{8}$ in. (breaking strength, 13.1 tons) and $\frac{3}{4}$ in. (breaking strength, 18.7 tons).

Machine Removes Soft Stone, Clay and Slate From Gravel

The Knickerbocker Co., Jackson, Mich., manufactures the Knickerbocker soft stone eliminator, a machine for removing soft stone—shale, ochre, sandstone, etc., from gravel. This device is said to enable a gravel that, aside from its natural content of soft stone, is suitable for concrete work, to pass the most rigid specifications. It eliminates the picking belt found in many plants and improves the quality of the product of any pit where soft stone may be found.

The eliminator consists of a rotor revolving in a vertical plane within a suitable casing, the rotor being supported by a heavy shaft revolving in two roller-bearing pillow blocks. The impact bars in the rotor are made of high-alloy, specially heat-treated steel, to secure properties to withstand successfully the impact and abrasion encountered in operation. The rotor is carefully equilibrated for both static and dynamic balance when assembled, so as to run without vibration at the required speeds. The machine is mounted on an electrically-welded frame fabricated of structural members and is furnished complete with a pulley for lineshaft or



Soft stone eliminator with side plate removed to show construction.

motor drive. It is made in one size only with a capacity of from 50 to 90 tons per hour. A 20 hp. motor is said to be ample to operate it at capacity.

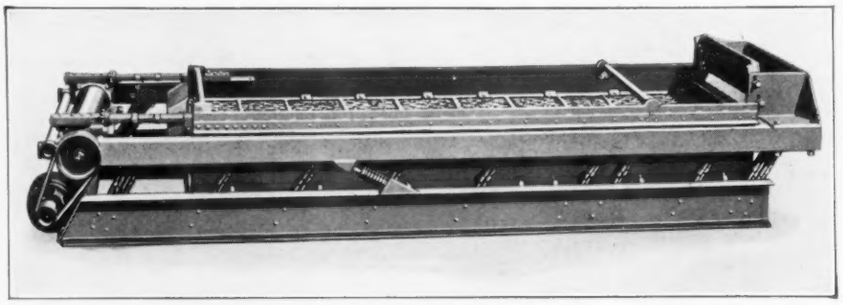
This unit is designed to be set in the production line at a point after the sand has been removed. Stone fed into the machine drops until it reaches the impact bars in the rotor where it is subjected to repeated blows from these bars until it completes the course around the machine and reaches the discharge opening. Water is introduced at the inlet and the pulverized soft stone runs off at the bottom in the form of fine sand or very small stone particles.

Develop Process For Lime Hydration aud Classification

A complete process for treating lime has been developed by William J. Kuntz, York, Pa., well-known lime-plant designer and engineer, and U. S. patent No. 1,954,211 was granted April 10, 1934, to cover this process. Briefly, this process hydrates lime and classifies it into pebble and other desired sizes. As the lime comes from the kilns it is broken down naturally by water. The water, which is heated in consequence, is employed in treating an additional quantity of lime. Another object of the invention is the breaking up of raw lime by means of water, the heated water containing lime being employed to break up fresh quantities of raw lime in a hydrator in which the steam generated rushes into the treatment zone of the hydrator and is then condensed, thus supplying the lime with further moisture under a vacuum.

A further object of the invention is to combine the grading of the lime, both hydrated and unhydrated, with the hydrating process in such manner as automatically to separate out various grades of commercial lime and to work over material not entirely suitable for commercial uses until it becomes suitable, rejecting the unsuitable material.

A further object is the provision of a process in which the raw lime is broken



Side view of screen showing springs connecting screen and main frames to balance frame. Flexible connection of screen frame to drive at left.

down with water, after which the hydrated lime is aërated and dried and separated in the various stages of the selection into grades. One of the features of the process is that no lime is carried out of any of the various elements to the atmosphere. The hydrated lime when bagged is said to be in a state ready for immediate use.

The patent also provides for such changes and modifications as shall define no material departure from its salient features. Single or multiple separation of the raw lime and the hydrated lime are provided for.

The raw lime from the kilns or the raw storage-bin is discharged over a 2-deck vibrating screen. The material retained on the upper deck is discharged into the hydrator-feed bin, the intermediate size into the pebble-lime storage-tank and the fines into a ground-lime tank. If desired, only one deck of the screen can be used, the coarse material going to the hydrator-feed bin and the fines to either of the other two tanks or *vice versa*. The pebble-lime bin is arranged so that it can discharge by conveyor to an elevator which discharges to another conveyor feeding back to the screen. Also when desired, the lime from the kilns can be discharged directly into the hydrator-feed bin, by-passing the screen by means of an extension of the raw-lime conveyor and a chute.

A rotary feeder discharges the lime from the hydrator-feed bin through a hopper into the continuous hydrator. A chute above this feeder allows the lime from this bin to be carried, when desired, by a conveyor to a beater mill, from which it again passes over the vibrating screen.

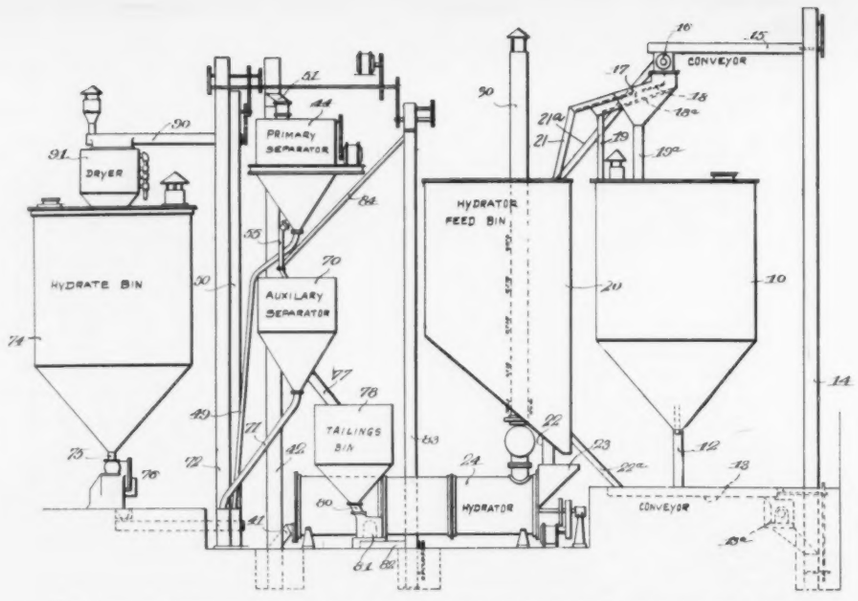
The lime is fed to a revolving screen in the hydrator, where it is sprayed with water. The resulting steam breaks down the lime and becomes laden with some of it. The core and unburned material are retained on the screen and discharged at the feed end of the hydrator, where it can be removed through a door.

The lime-laden steam passes to a condenser where it encounters a baffle which retards the rate of flow sufficiently to cause the steam to give up its lime. In addition, sprays above the baffle condense the steam with a predetermined quantity of water and insure precipitation of all the lime. This lime-laden water or milk of lime then drops to a pipe feeding the above-mentioned spray in the revolving screen. This water is heated in the condenser by its contact with the steam and this facilitates the rapid formation of the hydrate. Another pipe carrying fresh water passes through the condenser where this water is also heated before being sprayed into the treatment zone of the hydrator.

The hydrated lime passes through the revolving screen and is then moved, by a spiral blade attached to the periphery of the screen, into the treatment zone. The shaft to which the screen is attached extends entirely through the hydrator. A stirrer attached to this shaft turns the material over in the treatment zone. Another series of blades moves the lime forward toward the discharge end of the hydrator, while another series with a lesser number of blades tends to retard the flow somewhat and insure thorough hydration.

The hydrate is then discharged through a pipe to an elevator which in turn discharges it to a selector and aërator. This has a series of blades, revolving through a shaft, which act as a centrifugal selector for the hydrate. The fine particles are thrown outward and pass downward, passing out through the conical bottom of the selector to an elevator feeding a conveyor running to a drier.

The heavier particles pass downward through a central chamber, where they are aërated through the agitation of the air by the revolving blades. These particles drop to a secondary or auxiliary selector and aërator of the same general design. The tailings from this unit are discharged to a tailings bin and consist of cores, unburned lime and foreign matter covered with fine hydrated lime. To remove these fines the material is passed through a beater mill (covered by a separate patent, No. 1,742,511). The fines from this mill



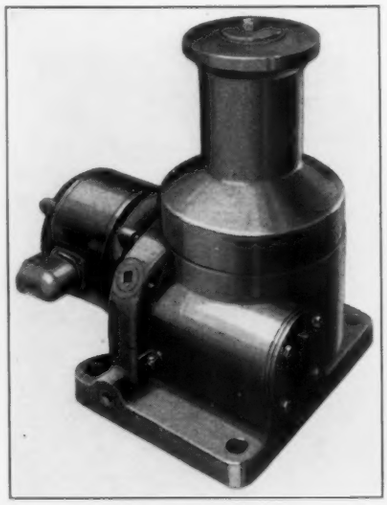
Side elevation of equipment used in new patented process for hydrating and classifying lime.

are then taken by a separate conveyor and elevator back to the auxiliary selector. The cores are ejected from the mill. The fine particles from the auxiliary selector are fed to another elevator and are discharged through chutes into either of the two hydrate storage bins. In some cases only a single selector, which can be adjusted for each grade of hydrate, may be required.

As was stated above the fines from the first selector are fed to a drier, which consists of a chamber in which are coils of steam pipes arranged in staggered rows so that the hydrate will fall from one pipe to another as it dries. The dried hydrate is discharged into one of the two hydrate bins. The steam caused by evaporation of the moisture in the lime passes from the drier through a tower having a baffle which precipitates any lime in this steam. This lime and the fines from the second selector are said to have less than ½ of 1 per cent. of moisture. Both hydrate bins are equipped with bagging devices.

Electric Car Spotter Motor Attached to Side of Housing

The Link-Belt Co., Chicago, Ill., announces that its vertical-capstan electric car spotter will hereafter be furnished



Vertical-capstan electric car spotter with integral drive motor at left.

"Motorized," meaning that the motor will be attached direct to side of spotter housing, with the result that no motor shaft coupling or separate motor base plate will be required. With motor bolted to side of spotter housing, proper initial and permanent alignment of motor shaft is assured; and the plan measurements of foundation required are a minimum.

The motor shaft extends into a substantial one-piece housing, which contains all gears, a helical-gear reduction at motor, and a worm-gear set. The gears run in oil, and are readily accessible. The motor is of high-torque fully enclosed type, and can be removed as a unit complete with motor pinion, without disturbing the rest of the machine. The capstan is machine finished to prolong the life of the car haulage rope.

The Link-Belt Motorized Spotter, like its predecessor, is available in two sizes. The smaller machine has a rope pull of 5,000 lb., and the larger size, 10,000 lb.

Manufacturer Adds Fourth of Series of Gasoline Engines

The Hercules Motors Corp., Canton, Ohio, has added a larger bore model to their "JX" series of 6-cyl. gasoline engines. This engine, the "JXD" has a 320 cu.in. displacement. It develops 83.8 hp. at 2800 r.p.m. and 65.5 hp. at 1800 r.p.m. with maximum torque of 204 ft. lbs. at 1000 r.p.m. (N.A.C.C. Rating 38.4 hp.). A 2½-in. chrome molybdenum crankshaft is supported by seven bearings of the high lead-bronze precision type. The cylinder and crankcase are cast integral of molybdenum alloy iron. The cylinder head is detachable and of "L" head design.

Lubrication is forced feed by geared pump to all connecting rod and main bearings, oil thrown off from the rods lubricating the cylinder walls. Aluminum alloy pistons are fitted with four rings all above the piston pins. A four-bearing camshaft located on the right side of engine looking from flywheel has all cams forged integral.

All connecting rod bearings are of the high lead bronze precision type, either a 1¼ in. or 1½ in. carburetor can be installed, and a distributor mounting is provided on the left hand side where the centrifugal water pump is also mounted. A magneto mounting is available as optional equipment. This "JXD" is supplied with No. 3, 4 or 5 bellhousing for 3 or 4 point suspension and flywheels for any standard clutch.

The three other sizes in this "JX" series —all very popular models are: "JXA,"

228 cu.in., 63 hp. at 2800 r.p.m.; "JXB", 263 cu.in., 68 hp. at 2800 r.p.m.; "JXC," 282 cu.in., 73 hp. at 2800 r.p.m.

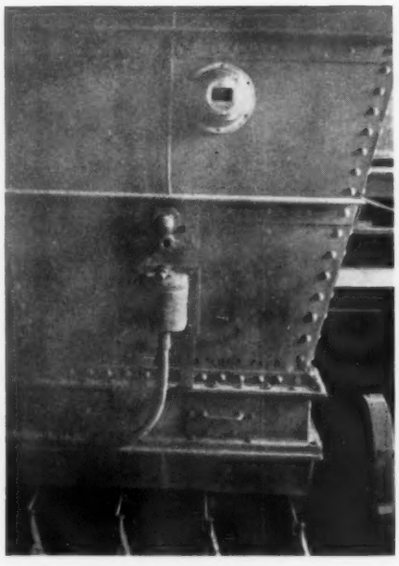
All four engines in this series are identical as to installation measurements, which facilitates the installing of the model developing the desired performance. The four sizes in this series are also supplied as power units, either of the open or fully enclosed type. Radiators, clutches, electrical units and all required accessories such as reduction gears and stub shafts are available to best meet the particular application.

Device Indicates and Controls Levels in Bins Automatically

The Bin-Dicator, a device for indicating the level of material in bins, made by the Ripley Manufacturing Co., Wayne, Mich., was described in detail in the October, 1934, issue of PIT AND QUARRY. This description, however, did not discuss the automatic control of this device over the feed to storage. Through the use of two Bin-Dicators on a bin at the desired levels the material level is automatically maintained between these two points. One unit automatically starts the feeding device when the material reaches the lower level while the other stops the feed when the top level is again reached.

One installation is on a bag-packing machine in the new cement storage and packing plant of the Huron Portland Cement Co., at Oswego, N. Y. By means of a rotary type feeder and two Bin-Dicators the cement level in the packer feed bin is automatically maintained between these two points. The operator simply starts the packer and sacks the cement and the Bin-Dicators do the rest. This arrangement not only saves time and labor in filling the packer tanks and avoids delays in output due to empty tanks, but is also helpful in maintaining uniform weights of the sacked material.

The same company's plant at Buffalo, N. Y., has a different arrangement. High and low level Bin-Dicators are mounted on all packer bins at this plant. Lights operated by these units are located in the basement of the plant so that the employee controlling the conveying system to these bins knows at all times how much cement is in each bin. In other installations the Bin-Dicators are used only to indicate when bins are full.



Device for indicating material level attached to packer feed bin

New Reduction Roll Crusher Designed for Higher Speeds

A new reduction roll crusher, built primarily to produce material from 1½ in. down to dust (though it will handle larger sizes) has been announced by the Austin-Western Road Machinery Co. of Aurora, Ill. According to the manufacturers, it requires less power and since it operates faster (60 r.p.m.) its capacity is therefore greater.

The rolls measure 18 in. wide by 30 in. in diameter and are equipped with 2 in. thick, removable, manganese shells. Each roll is supported by two, large SKF, self-aligning, roller bearings, that rotate on heavy stationary shafts. These bearings are located inside the rolls, close to the outer shaft supports to materially reduce shaft load.

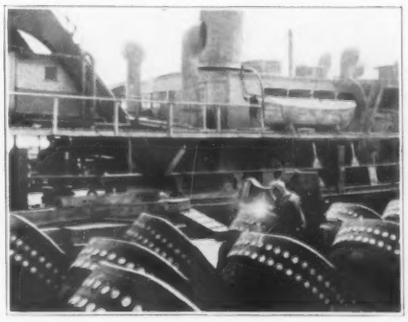
All crusher shafts, when operating under load are subject to a certain amount of deflection which if not corrected will cause premature and excess wear or heating; such conditions cannot develop in this crusher because the bearings can never get out of alignment.

Two massive screws (heavy-spring equipped) permit any desired adjustment of rolls and act as safety releases against tramp iron or other uncrushable material.

Belt driven pulley shaft is geared to sprocket countershaft using heavy roller chain to operate the rolls. The chain drive permits a greater variation in the spread of the rolls, hence a greater variation of finished sizes. Gearing, sprockets and chain are fully enclosed with heavy metal guards — Alemite lubrication is used throughout.

Life of Dredge Bucket Lips Increased by Hard-Surfacing

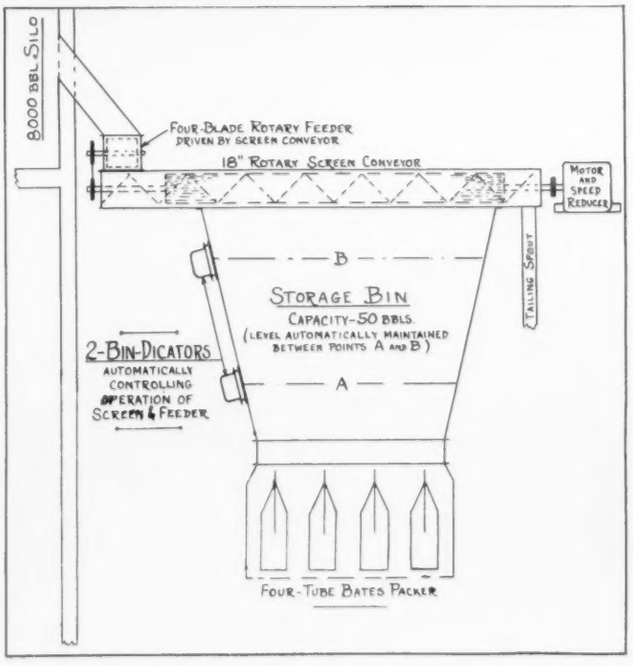
A large Eastern dredging company increases the life of its dredge buckets by hard-facing with Haynes Stellite. The accompanying illustration shows one of 54 buckets being protected against the wearing action of highly-abrasive sand, gravel, mud and clay by an electrically-welded layer of this cobalt-chromium, tungsten hard-facing alloy. It is said that three pounds of this material applied to the wearing sections of the lip of each bucket increases its life many times.



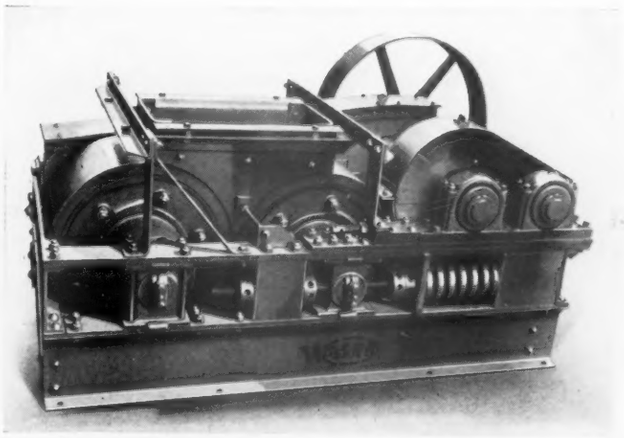
Dredge buckets hard-faced to resist abrasion.

Line of Improved Respirators Has Many Comfort Features

A line of new, improved respirators for protecting workers against inhaling lead, silica and similar dusts, and spray mists, has been developed by the Pulmosan Safety Equipment Corp., Brooklyn, N. Y., after experiments and tests with the aid of dust control engineers. The new line is called the "M" series. Among the many improved features reported by the manufacturer, are: An increased filter size, a direct breathing intake and coarser wire screens, to permit easier breathing. Screens are bound with aluminum for greater strength and safety. A gas mask type exhaust valve is used that is positive in action. A change has been made from elastic headbands to all-rubber, adjustable headbands for longer wear. Headbands are attached to a swivel joint that allows free movement of the head without respirator leaving the face. New construction prevents obstruction of wearers' vision.



Bag packer feed bin with two Bin-Dicators automatically controlling feeder and screw conveyor.



Reduction roll crusher designed to operate at higher than usual speeds.

Coal Is Chemically Treated to Improve Burning Conditions

THE problem of improving cement burning conditions and reducing fuel costs has been the focal point of major interest in the cement industry during recent years. The desired end has been approached from different points of view such as pulverizing the fuel, improving the fuel-injection methods, preheating the air, reducing heat losses, and so on. A new point of attack is presented by the chemical treatment of the coal used, a method announced by the Technicoal Sales Corp., 1010 Euclid Av., Cleveland, O. Its product, called Procite-Treated Technicoal, is a low-ash, high-heat-value coal that has been technically prepared to make it an excellent fuel for modern high-rating combustion use. This coal has been successfully used for modern boilers, cement burning, gas producers, etc.

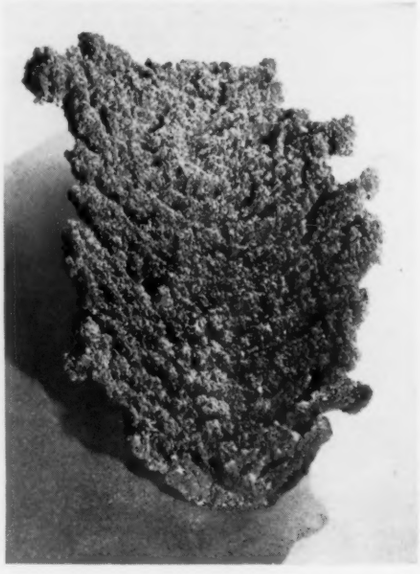
Technicoal has an inherent ash content of 6 per cent. and a specific gravity of 1.45, and is sold with a guarantee that it will not vary by 1 per cent. from a guaranteed analysis. This coal is first cleaned by the Chance flotation process which removes not only all the impurities but also all the coal having more than 6 per cent. inherent ash. As the coal leaves the cone cleaner it is automatically sprayed and impregnated with a solution of Procite. This is a chemical treatment, permanently affixed to Technicoal and unaffected by weather conditions and is said to eliminate all the objectionable features hitherto found in coals of moderate sulphur content.

It is claimed that Procite conditioning does not add to the heat value of Technicoal, raise the fusion temperature of its ash, or lower the sulphur content, but it does effect the complete removal of the sulphur during combustion at all temperatures in excess of 1,000 deg. F. Due to the removal of the sulphur, the iron in the ash (with which the sulphur is always found as ferrous sulphide—melting point 2,140 deg. F.) is changed to ferric oxide (melting point 2,800 deg. F.).

This change in the form of the iron results in porous, friable and free-moving ash, in place of the customary heavy metallic consolidated clinker. The removal of the sulphur changes the clinker characteristics from a fused acid mass to a neutral silica-iron-lime slag which will not adhere to the metallic grate surfaces or to the refractory furnace linings. Such clinkers as are formed are easily broken by movement in the fire-bed, either mechanically or by hand, and are easily removed by any of the conventional dumping devices used with modern furnaces.

Technicoal can be safely fired under modern boilers operating up to 400 deg. of rating, and at fire-bed temperatures in excess of 2,800 deg. F. It will minimize corrosion, reduce the smoke nuisance commonly associated with high-volatile coals, lower the combustible loss in the ash pit, and will not form objectionable clinkers.

"Procite-conditioned coals," according to F. H. Westlake, Jr., the company's engineer, "have proved very valuable for the manufacture of Portland cements because of the fact that they are high in iron and sulphur compounds. Complete elimination of the sulphur during combustion, effected by the Procite treatment, leaves the entire iron content of the ash free to flux with the cement-making materials at an early temperature. This complete early fluxing of the iron in the coal ash has enabled Procite-conditioned coals to effect the following



Porous, friable and free-moving ash resulting from Technicoal.

changes and economies in the manufacture of Portland cement:

(1) Lower coal consumption; (2) increased kiln production; (3) more uniform operating conditions; (4) prevention of kiln-ring formations; (5) lower sulphur content of the cement clinker; (6) improved finished neat cement color; (7) increased uniformity of the cement clinker; (8) increased tensile strength of the finished neat cement; (9) increased grindability of the cement clinker; and (10) a controlled calcining zone from improved flame characteristics.

"1. Procite-conditioned coal has lowered the coal consumption per barrel of clinker in every instance where it has been used. This fuel saving has averaged between 11 and 18 lb. of coal per bbl. of cement clinker and is the result of several factors: (a) The inherently low ash-fusion temperatures; (b) the iron in the ash is free to enter into combination with lime and silica at early temperatures, as it is entirely free of sulphur; (c) complete oxidation is more rapidly effected because of the presence of a small quantity of nascent chlorine in the atmosphere of the kiln; and (d) the clear flame brings the calcining zone closer to the burner and actually shortens the length of the calcining zone. (The actual clinker burning zone in the kiln is a definite band which can be easily watched and controlled by the kiln operator.)

"2. Procite-conditioned coals have increased kiln production in each instance. This is attributable to the following factors: (a) The entire elimination of kiln-ring formation and the removal of old rings left by prior coals; (b) earlier flux of the cement-making materials due to the ready combination of sulphur-free coal ash; (c) more uniform calcining zone; and (d) greater degree of oxidation in kiln, induced by the Procite treatment.

"3. More uniform kiln operating conditions are maintained by Procite-conditioned coals, because: (a) Variations resulting from inequalities in the coal feed, sulphur content, and air supply to the kiln are somewhat equalized by the constant liberation of nascent chlorine from the Procite formula; and (b) the definite calcining zone close to the burner allows exact control of the final calcination.

"4. Kiln-ring formations are entirely eliminated by the use of Procite-conditioned coals. Various authorities in the cement industry have attributed kiln-ring formations to: (1) reducing the atmosphere in the kiln, (2) the use of low-volatile or very-slow-burning coals, (3) using coals high in sulphur compounds, and (4) using coals having a low ash-fusion temperature. Procite-conditioned coals meet these objections in the order named.

"The continued release of nascent chlorine overcomes any tendency toward a reducing atmosphere in the kiln; the high degree of oxidation induced by the Procite treatment tends to consume all particles of coal before they have a chance to escape the calcining zone; complete oxidation of the sulphur from the coal ash prevents ring formation from iron-sulphide compounds and removes the sulphur from the raw mix in the kiln; Procite-treated coals have an ash which is exceptionally high in iron and which, being entirely free of sulphur, fluxes readily with the cement-making materials, eliminating the possibility of kiln-ring formation.

"5. Procite-conditioned coals are high in sulphur, averaging from 2 per cent. to 4.5 per cent., yet these coals will produce a cement clinker having a lower sulphur-anhydride (SO_3) content than clinkers made from untreated 1 per cent. sulphur coal. This is due to the fact that Procite treatment not only oxidizes the sulphur from the coal ash during actual combustion, but also oxidizes the sulphur from the raw mix during the same operation. At the three cement plants now using Proc-

Plant in which Procite-treated Technicoal is prepared.

ite-treated coals the sulphur content of the cement clinkers has been lowered from 0.3 per cent. to 0.0068 per cent.

"6. Procite - conditioned coals will produce a finished cement which has a much lighter and better color. The new material is never subject to a reducing flame and the resulting brown discoloration. The iron content of the clinker is entirely free of sulphur, eliminating all sulphide discoloration. Complete consumption of the coal in the calcining zone eliminates particles of free carbon with their resultant discoloration. The definitely-controlled calcining zone in the kiln overcomes the danger of the clinker being overburned and prevents the resultant ferrous-iron discoloration.

"7. The complete uniformity of quality in the cement clinkers made with Procite-conditioned coal are due to the compact, easily-controlled-calcining zone in the kiln; the intense, uniform, strongly - oxidizing flame characteristics and the complete removal of the sulphur from the clinker, giving a uniform early flux and good color.

"8. The tensile strength of cement made with Procite-conditioned coals has been found to be greater than that made with low-sulphur untreated coals. This has been proved to be due to the increased iron content of the cement clinker, as all the iron in the Procite-treated coal ash is free to combine with the cement-making materials. Untreated coal having 1 per cent. sulphur by weight and 0.03 per cent. iron by weight will have only 0.02 per cent. of its iron available for fluxing in the clinker, as 30 per cent. of the sulphur present will remain in combination with the iron in the ash even in a strong oxidizing atmosphere. However, a treated 4-per cent. sulphur coal, having 0.03 per cent. iron in its ash, will leave the iron entirely free of sulphur and the entire quantity of iron will enter into combination with the cement-making materials, giving the clinker one-third more iron for the same amount of coal. Procite-conditioned coals remove the sulphur which would ordinarily remain in the clinker as iron sulphide from untreated coal. These iron-sulphide particles have not fluxed with the cement-making materials, but remain free in the clinker and cause a noticeable discoloration. By eliminating the sulphur from this combination, the fluxed-iron content of the clinker is increased and the color is improved at the same time.

"9. The increase in grindability of cement clinkers made with Procite-conditioned coals is quite noticeable and has resulted in material power-cost savings in the cement mills using the treated coals. The increased grindability is entirely due to the complete uniformity of the clinker produced by the Procite-treated coals. There are no overburned particles or free iron-sulphide compounds present to retard the grinding.

"10. The intense flame characteristics of Procite-conditioned coals have resulted in bringing the calcining zone closer to the end of the kiln, as well as shortening the actual calcining zone itself. The operator is more readily able to control the burning and temperature conditions by observation. The relatively short calcining zone eliminates the danger of overburning a portion of the clinkers, as none of the mass is subjected to the intense burn for an overly-long period. The refractory kiln lining is more easily protected with the entire calcining zone under observation, as a loss of coating is immediately corrected."

Conveyor Industry Elects Code Authority Members

At a recent meeting of the Conveyor and Material Preparation Equipment Industry held in Cincinnati, O., George Torrence, president of the Link-Belt Co., Chicago, Ill., was elected chairman of the code authority for that industry. Among others named to the code authority were: D. B. Piersen, president of the Stephens-Adamson Mfg. Co., Aurora, Ill., and W. B. Greene, vice president and treasurer of the Barber Greene Co., Aurora, Ill.

Grant Patents on Cement Processing Improvements

Harry M. Larmour and Stephen C. Pierce, Jr., chemical engineers, Merced, Cal., have been granted two patents on cement processing improvements, according to an announcement by the U. S. Patent Office. Ten features of originality were patented for their commercial rights in the process, which now is being used at the Merced plant of the Yosemite Portland Cement Co., where the men are employed.

U. S. Gypsum Co. Acquires Insulating Board Plant

The United States Gypsum Co., Chicago, Ill., announces that it has purchased the Arborite Co., Lisbon Falls, Maine, manufacturers of insulating board, lath and tile. The Arborite line of products will be continued and the U. S. Gypsum brands will be added. The company states that this new acquisition rounds out its national distribution facilities on insulating board products.

The Louis Allis Co., Milwaukee, Wis., announce a change in the location and management of their Pittsburgh office. The office will be located at 537 Oliver Bldg. and will be in charge of J. F. Rodgers.

Classified Buyers' Guide

A Directory of Pit and Quarry Advertisers Arranged According to Product

Although every effort is made to insure accuracy and completeness in these listings, the publisher cannot accept responsibility for errors or omissions. Any mistakes discovered will gladly be rectified, if brought to the attention of the Advertisers' Service Department.

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Alloys (Steel)
Manganese Steel Forge Co.

Arresters (Lightning)
*General Electric Co.

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American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
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Hetherington & Berner, Inc.
*Link-Belt Co.
*Robins Conveying Belt Co.

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*Bartlett & Snow Co., C. O.

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*Kennedy-Van Saun Mfg. and Eng. Corp.
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*Bartlett & Snow Co., C. O.
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*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

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Goodyear Tire & Rubber Co.

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*Allis-Chalmers Mfg. Co.
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Sprout, Waldron & Co.

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*Robins Conveying Belt Co.
Sprout, Waldron & Co.

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*Hercules Powder Co.

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Sprout, Waldron & Co.

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*Tyler Co., W. S.

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Buckets (Clamshell, Orange-Peel, Etc.)
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Link-Belt Co.
Pettibone Mulliken Co.
Wellman Engr. Co.

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*Bartlett & Snow Co., C. O.
*Link-Belt Co.
Wellman Engr. Co.

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*Bartlett & Snow Co., C. O.
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*Link-Belt Co.

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*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.

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*Bartlett & Snow Co., C. O.
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*Robins Conveying Belt Co.
Sprout, Waldron & Co.

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Sprout, Waldron & Co.

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*Bartlett & Snow Co., C. O.
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*Hendrick Mfg. Co.
*Link-Belt Co.
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*Link-Belt Co.

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*American Steel & Wire Co.

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Sprout, Waldron & Co.

Coal
Technicoal Sales Corp.

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*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
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*Link-Belt Co.
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*General Electric Co.

Converters (Electric)
*General Electric Co.

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*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

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Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Morrow Mfg. Co.
*Robins Conveying Belt Co.
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Sprout, Waldron & Co.
*Universal Crusher Co.

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*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Cranes (Crawler and Locomotive)
*Austin-Western Road Machy. Co.
*Link-Belt Co.
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Crusher Parts
American Manganese Steel Co.
*American Pulverizer Co.
*Bartlett & Snow Co., C. O.
*Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.
Pettibone Mulliken Co.

Crushers (Cone)
*Nordberg Mfg. Co.

Crushers (Hammer)
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
*Austin-Western Road Machy. Co.
*Bartlett & Snow Co., C. O.
Bonnot Co.
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*Kennedy-Van Saun Mfg. and Eng. Corp.
*Universal Crusher Co.

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*Austin-Western Road Machy. Co.
*Bartlett & Snow Co., C. O.
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Smith Engr. Works
*Universal Crusher Co.

Crushers (Ring)
*American Pulverizer Co.
*Bartlett & Snow Co., C. O.

Crushers (Roll)
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*American Pulverizer Co.
*Austin-Western Road Machy. Co.
*Bartlett & Snow Co., C. O.
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*Link-Belt Co.
McLanahan and Stone Corp.
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*Allis-Chalmers Mfg. Co.
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*Austin-Western Road Machy. Co.
*Bartlett & Snow Co., C. O.
Bonnot Co.

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*Allis-Chalmers Mfg. Co.
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Bonnot Co.
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Pettibone Mulliken Co.

Dragline Cableway Excavators
*Link-Belt Co.

Dragline Excavators
*Austin-Western Road Machy. Co.
*Link-Belt Co.
Ohio Power Shovel Co.

Dredges
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*Morris Machine Works

Drilling Contractors
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Drills (Core)
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Drills, Diamond
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Drills (Well) (See Drills—Blast-Hole)

Drives (Multiple, Belt, Chain, Rope)
*Allis-Chalmers Mfg. Co.

*** See also information in the 1934 Pit and Quarry HANDBOOK.**

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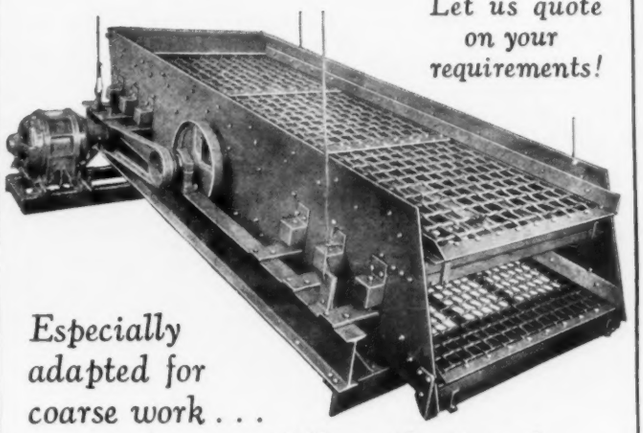

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A-43-N

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Stationary shafts have the further advantage of insuring perfect bearing alignment at all times. In other types of construction the bearings must move parallel to the frame as the springs compress during the crushing operation, and since the two bearings on the same shaft seldom move exactly alike, there is almost always misalignment with resultant heating and excessive wear. Western design keeps the bearings in line at all times.

Other important features in this fine reduction crusher are:

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4. **Easy adjustment of rolls for material from 1½ inches to dust.**

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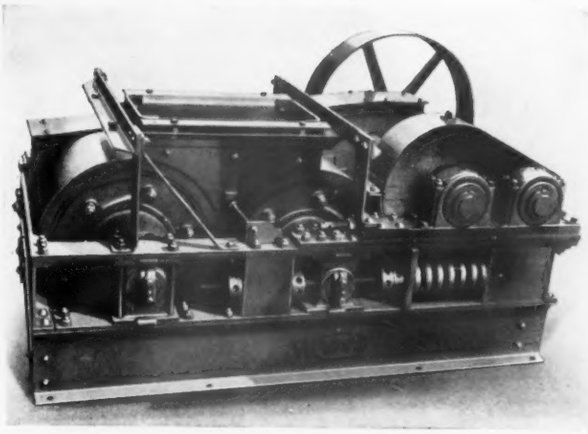

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Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

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McLanahan and Stone Corp.
*Tyler Co., W. S.

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*Allis-Chalmers Mfg. Co.
Raymond Bros. Impact Pulv. Co.

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Sprout, Waldron & Co.

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American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Eagle Iron Works
*Hendrick Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdy. & Mach. Co.
Manganese Steel Forge Co.
Pettibone Mulliken Co.
*Robins Conveying Belt Co.
Smith Engr. Works

Guards (Wire)
*Bartlett & Snow Co., C. O.
Manganese Steel Forge Co.
National Wire Cloth Co.

Guns (Hydraulic)
Hetherington & Berner, Inc.

Hammer Mills (See Crushers—Hammer)

Haulage Systems (Electric)
*General Electric Co.

Hoists
*Bartlett & Snow Co., C. O.
Hetherington & Berner, Inc.
*Link-Belt Co.
McLanahan and Stone Corp.
Smith Engr. Works
Sprout, Waldron & Co.

Hoppers
*Hendrick Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.

Hose (Air, Steam and Water)
Goodyear Tire & Rubber Co.

Hose Couplings (See Couplings)

Hydraulic Guns (See Guns—Hydraulic)

Idlers
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.

Kilns and Coolers (Rotary)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Bonnot Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Lights (Flood)
*General Electric Co.

Lime-Handling Equipment
*Bartlett & Snow Co., C. O.
*Link-Belt Co.
Raymond Bros. Impact Pulv. Co.
*Robins Conveying Belt Co.

Lime Kilns
*Bartlett & Snow Co., C. O.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Linings (Ball- and Tube-Mill) (See Mill Liners and Linings)

Loaders and Unloaders
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Locomotives (Diesel)
*Fate-Root-Heath Co.
*Plymouth Locomotive Works

Locomotives (Diesel-Electric)
*Fate-Root-Heath Co.
*General Electric Co.
*Plymouth Locomotive Works

Locomotives (Electric, Gas and Steam)
*Fate-Root-Heath Co.
*General Electric Co.
*Lima Locomotive Works
*Plymouth Locomotive Works

Locomotives (Gas-Electric)
*Fate-Root-Heath Co.
*General Electric Co.
*Plymouth Locomotive Works

Locomotives (Oil-Electric)
*Fate-Root-Heath Co.
*General Electric Co.
*Plymouth Locomotive Works

Locomotives (Storage Battery)
*General Electric Co.

Locomotives (Trolley-Battery)
*General Electric Co.

Magnetic Pulleys (See Pulleys, Magnetic)

Manganese Steel
American Manganese Steel Co.
Manganese Steel Forge Co.
Pettibone Mulliken Co.

Manganese Steel (Plates and Sheets)
American Manganese Steel Co.
Manganese Steel Forge Co.
Pettibone Mulliken Co.

Measuring Devices (Electric)
*General Electric Co.

Mill Liners and Linings
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Mills (Grinding) (See also Crushers—Hammer)
*Allis-Chalmers Mfg. Co.
*American Pulverizer Co.
*Bartlett & Snow Co., C. O.
Bonnot Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdy. & Mch. Co.
Raymond Bros. Impact Pulv. Co.
Sprout, Waldron & Co.

Motor Trucks
General Motors Truck Co.

Motors and Generators
*Allis-Chalmers Mfg. Co.
*General Electric Co.

Motors (Internal-Combustion) (See Engines — Internal-Combustion)

Nails
*American Steel & Wire Co.

Netting (Locomotive Stack)
Buffalo Wire Works Co.
*Tyler Co., W. S.

Nozzles (Gravel Washing)
*Deister Concentrator Co.

Nozzles (Hydraulic) (See Guns —Hydraulic)

Nozzles (Spray)
*Deister Concentrator Co.

Packings
Goodyear Tire and Rubber Co.

Partitions (Wire)
Buffalo Wire Works Co.
National Wire Cloth Co.

Perforated Metal Plates
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Chicago Perforating Co.
*Hendrick Mfg. Co.
Morrow Mfg. Co.
Sprout, Waldron & Co.

Pipe Flanges
Hetherington & Berner, Inc.

Plug Valves (See Valves)

Pneumatic Drills (See Drills, Rock)

Portable Conveyors
Haiss Mfg. Co., Geo.
*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Portable Crushing and Screening Plants
*Austin-Western Road Machy. Co.
*Bartlett & Snow Co., C. O.
*Universal Crusher Co.

Portable Engines (See Engines —Internal Combustion)

Portable Loaders (See Loaders and Unloaders)

Power Cables (Rubber Clad)
*American Steel & Wire Co.

Power Shovels (See Shovels, Electric, Internal-Combustion and Steam)

Pulleys (Magnetic)
Sprout, Waldron & Co.

Pulleys (Wing)
Sprout, Waldron & Co.

Pulverized Fuel Systems
*Bartlett & Snow Co., C. O.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Raymond Bros. Impact Pulv. Co.

Pulverizers (See also Crushers; Mills; etc.)
*American Pulverizer Co.
*Austin-Western Road Machy. Co.
*Bartlett & Snow Co., C. O.
Bonnot Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
Raymond Bros. Impact Pulv. Co.
*Universal Crusher Co.

Pump Valves (See Valves Pump)

Pumps (Cement Slurry)
Allen-Sherman-Hoff Co.
*Morris Machine Works

Pumps (Centrifugal)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Erie Pump & Engine Works
Hetherington & Berner, Inc.
*Morris Machine Works
Pettibone Mulliken Co.

Pumps (Dredging)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Erie Pump & Engine Works
Hetherington & Berner, Inc.
*Morris Machine Works
Pettibone Mulliken Co.

Pumps (Sand and Gravel)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Erie Pump & Engine Works
Hetherington & Berner, Inc.
*Morris Machine Works
Pettibone Mulliken Co.

Ready-Mixed Concrete Plants
*Bartlett & Snow Co., C. O.

Respirators
Pulmosan Safety Equipment Corp.

*** See also information in the 1934 Pit and Quarry HANDBOOK.**

Yes! it can be profitable to hook up jackhammer holes with Cordeau-
CORDEAU BICKFORD
SAFETY FUSE and LIGHTERS
Drill'em all!
then load and hook-up with Cordeau
CORDEAU BICKFORD
SAFETY FUSE and LIGHTERS
Let's get one Job DONE!
CORDEAU BICKFORD DETONATING FUSE
THE ENSIGN-BICKFORD COMPANY
May we repeat
CORDEAU is an insensitive DETONATOR
CORDEAU BICKFORD

THEY ALL TELL THE SAME STORY

and Profits

SAFETY LIES IN SKILL

Skill in planning shots
Skill in using explosives
. . . these are *your* jobs.

Skill in making safety fuse and CORDEAU-BICKFORD DETONATING FUSE.

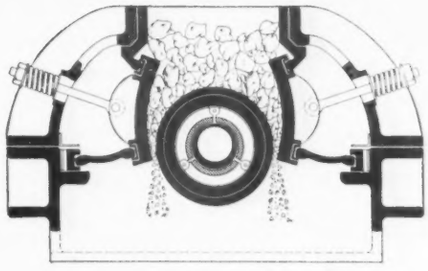
. . . these are *our* jobs, backed by 99 years' experience in 1935, 100 in 1936.

An insensitive detonator, CORDEAU-BICKFORD DETONATING FUSE has made the giant blast practicable and has brought to smaller hook-ups the same basic advantages: accurate timing, lower hazard, more power from explosives.

CB37

THE ENSIGN-BICKFORD CO.
CORDEAU DETONATING FUSE BICKFORD
SIMSBURY CONNECTICUT
Since 1836

BONNOT CRUSHERS for PROFIT



Note the Bonnot reduction principle featuring *slow creep mantle*, which insures even distribution of wear over the entire crushing area.

SCORES of operators are turning to Bonnot Reduction Crushers to meet today's demand for better materials at lower costs—with increased profits for themselves.

Note these Bonnot features, all contributing to economy:

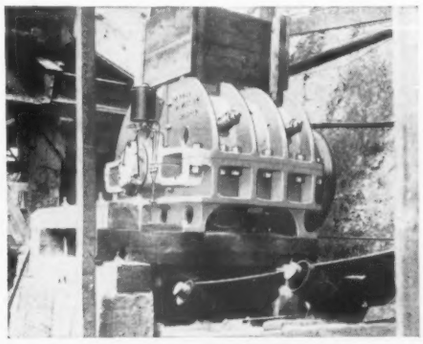
Long Life: Uniform wearing area with six times the average wearing surface. No gears, counter shafts or eccentric sleeves to cause mechanical troubles.

Lubrication: Positive force-feed grease lubrication individually adjusted to each bearing.

Power: Field tests show savings up to 50%. Crusher starts easily under full load.

Capacity: Continuous crushing action, without idle or back stroke, gives maximum capacity.

Maintenance: Manganese steel wearing parts. Heavy alloy steel frame. All parts designed for 100% overload. Negligible upkeep cost.



Manufactured Under U. S. Patent No. 1,946,763.

Write for Bulletin No. 160

THE BONNOT CO.
CANTON, OHIO
Since 1891
New York Office—30 Church St.

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

Index to Advertisers on Page 64

Rheostats
*General Electric Co.

Rock Drills (See Drills—Rock)

Rod Mills
*Kennedy-Van Saun Mfg. and Eng. Corp.

Rope (Wire) (See Wire Rope)

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Pulmosan Safety Equipment Corp.

Sand Separators
*Bartlett & Snow Co., C. O.
*Link-Belt Co.
McLanahan and Stone Corp.
Smith Engr. Works

Sand-Settling Tanks
*Bartlett & Snow Co., C. O.
*Link-Belt Co.
Smith Engr. Works

Scrapers (Power Drag)
*Austin-Western Road Machy. Co.
*Link-Belt Co.

Screens
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
Buffalo Wire Works Co.
Chicago Perforating Co.
*Deister Concentrator Co.
Deister Machine Co.
*Eagle Iron Works
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
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McLanahan and Stone Corp.
Morrow Mfg. Co.
National Wire Cloth Co.
*Nordberg Mfg. Co.
Productive Equip. Corp.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.
*Tyler Co., W. S.
*Universal Crusher Co.

Screens (Vibrating or Shaking)
*Allis-Chalmers Mfg. Co.
*Austin-Western Road Machy. Co.
*Bartlett & Snow Co., C. O.
Buffalo Wire Works Co.
*Deister Concentrator Co.
Deister Machine Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
*Nordberg Mfg. Co.
Productive Equip. Corp.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.
*Tyler Co., W. S.
*Universal Crusher Co.

Scrubbers
*Tyler Co., W. S.

Separators (Air) (See Air Separators)

Sheaves
*Allis-Chalmers Mfg. Co.
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*Eagle Iron Works
Haiss Mfg. Co., Geo.
Hetherington & Berner, Inc.
*Link-Belt Co.
McLanahan and Stone Corp.
Pettibone Mulliken Co.
Sprout, Waldron & Co.

Shovels (Electric, Internal Combustion and Steam)
*Austin-Western Road Machy. Co.
*Link-Belt Co.
Ohio Power Shovel Co.

Skip Hoists and Skips
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Hetherington & Berner, Inc.
*Link-Belt Co.
*Robins Conveying Belt Co.

Speed Reduction Units
*General Electric Co.
*Link-Belt Co.

Spouts (See Chutes and Chute Liners)

Sprays
*Deister Concentrator Co.

Sprockets and Chain
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Link-Belt Co.
Pettibone Mulliken Co.
Sprout, Waldron & Co.

Starters (Automatic, Motor)
*General Electric Co.

Steel (Alloy)
(See Alloys—Steel)

Steel Grating (See Grating, Steel)

Steel Inclines (See Inclines, Steel)

Steel Plate Construction
*Hendrick Mfg. Co.
Hetherington & Berner, Inc.
Manganese Steel Forge Co.
Sprout, Waldron & Co.

Storage Equipment
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Link-Belt Co.

Sweeping Systems
Allen-Sherman-Hoff Co.

Switchboards (Electric)
*General Electric Co.

Switches (Safety)
*General Electric Co.

Tanks
*Bartlett & Snow Co., C. O.
*Hendrick Mfg. Co.
*Link-Belt Co.

Tanks (Sand-Settling)
*Bartlett & Snow Co., C. O.
*Link-Belt Co.
Morrow Mfg. Co.
Smith Engr. Works

Testing Sieves and Shakers
*Hendrick Mfg. Co.
*Tyler Co., W. S.

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Goodyear Tire & Rubber Co.

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Track Equipment
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Track Shifters
*Nordberg Mfg. Co.

Tractors
*Allis-Chalmers Mfg. Co.
*Fate-Root-Heath Co.
*Plymouth Locomotive Works

Trailers
General Motors Truck Co.

Tramways (Aerial)
*American Steel & Wire Co.

Transformers
*Allis-Chalmers Mfg. Co.
*General Electric Co.

Transmission Belting (See Belting)

Transmission Machinery
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Bartlett & Snow Co., C. O.
*Gruendler Crusher & Pulv. Co.
*Link-Belt Co.

Trippers
*Bartlett & Snow Co., C. O.
*Link-Belt Co.
*Robins Conveying Belt Co.

Truck Cranes (See Cranes)

Truck Mixers
*Bartlett & Snow Co., C. O.

Trucks and Trailers (See Motor Trucks)

Tube-Mills (See Mills—Ball, Tube, etc.)

Underground Loaders
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.

Unit Heaters
*General Electric Co.

Unloaders (Box Car)
*Bartlett & Snow Co., C. O.
*Link-Belt Co.

Variable Speed Reducers or Transmissions
*Link-Belt Co.

Vibrating Screen Plate
*Bartlett & Snow Co., C. O.
Chicago Perforating Co.
*Hendrick Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
Morrow Mfg. Co.

Vibrating Screens (See Screens—Vibrating)

Vibrators
*Tyler Co., W. S.

Washers (Sand, Gravel and Stone)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Eagle Iron Works
Haiss Mfg. Co., Geo.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Smith Engr. Works
*Tyler Co., W. S.

Welding & Cutting Equipment
*General Electric Co.

Welding Supplies
American Manganese Steel Co.
*American Steel & Wire Co.
*General Electric Co.
Manganese Steel Forge Co.

Well Drills (See Drills—Well)

Wheels (Car)
American Manganese Steel Co.
*Eagle Iron Works
Pettibone Mulliken Co.

Winches and Capstans
*Bartlett & Snow Co., C. O.
*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Wire & Cable (Electric)
*American Steel & Wire Co.
*General Electric Co.

Wire Cloth
Buffalo Wire Works Co.
Manganese Steel Forge Co.
National Wire Cloth Co.
*Robins Conveying Belt Co.
*Tyler Co., W. S.

Wire Rope
*American Steel & Wire Co.
Buffalo Wire Works Co.
Hazard Wire Rope Co.
Williamsport Wire Rope Co.

Wire-Rope Fittings
*American Steel & Wire Co.
Buffalo Wire Works Co.
Hazard Wire Rope Co.
Williamsport Wire Rope Co.

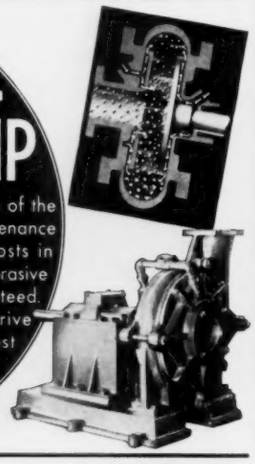
Wire Rope Slings
*American Steel & Wire Co.
Hazard Wire Rope Co.
Williamsport Wire Rope Co.

Wire (Welding)
*American Steel & Wire Co.
Manganese Steel Forge Co.

Worm Gears (See Gears and Pinions)

*** See also information in the 1934 Pit and Quarry HANDBOOK.**

HYDROSEAL DREDGE PUMP



Unique principle of hydrosealing both sides of the impeller against abrasive wear, cuts maintenance to a fraction and saves ⅓ in power costs in pumping sand, gravel, rock and other abrasive materials—Estimated economies guaranteed. Sizes 2" to 22", pulley or motor drive. Descriptive Catalog sent on request

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HENDRICK
PERFORATED METALS

are popular in the quarry fields. They wear well. Full range of sizes

Heat-Treated Double-Corrugated Plates

with square, round and "Sqround" perforations. Write for data, particularly on the new "Sqround" Mesh.

Investigate the Weston Testing Screen for making sizing tests.

HENDRICK MANUFACTURING CO. Carbondale, Pa.

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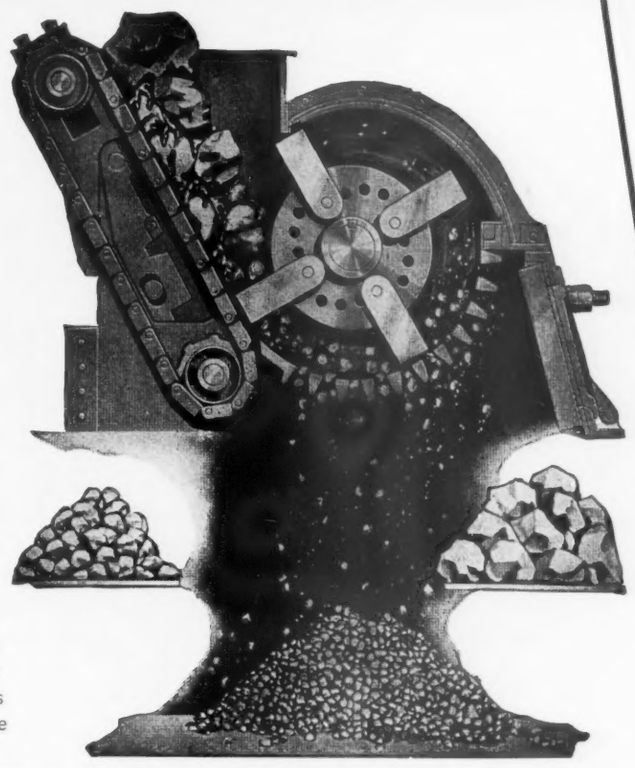
Detroit Hazleton New York Philadelphia Pittsburgh

DIXIE does a great Job of Crushing



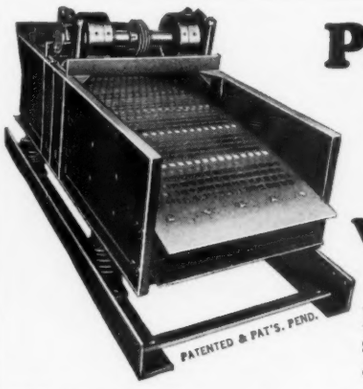
In cement plant or quarry, on all kinds of rock, the DIXIE MOGUL Hammer Mill steadily grinds out new records in production—dependably operating, day in and day out, without clogging, balking or breakdowns.

The extra sturdy construction of the DIXIE is exemplified by the special moving breaker plate which has 26 times the average wearing area. That means increased service life and reduced upkeep costs, real economy.

If you want a great crusher for doing a great job at lowest cost, specify the DIXIE for your primary, secondary or fine reduction. Available in 40 sizes for any capacity requirements. Write for DIXIE Catalog.

DIXIE MACHINERY MFG. COMPANY

4209 Goodfellow Avenue **St. Louis, Missouri**



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VIBRATING SCREEN

Built in all standard sizes and in from one to three decks.

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DEISTER COMPOUND FUNNEL CLASSIFIER

For hydraulic sizing of finer materials—5/16″ and down. Also for cleaning sand by elimination of silt, slime, vegetable matter and other light impurities.

Fully described in Bulletin No. 23

DEISTER MACHINE COMPANY

1933 EAST WAYNE STREET FT. WAYNE, IND.

"DIAMOND"

DREDGE PUMPS

Equipped with the

"WEAR RESISTER"

ARE CUTTING COSTS FOR THEIR OWNERS TODAY

•

Don't Delay

INVESTIGATE

YOU TOO CAN SAVE

•

SENSATIONAL pump performance is achieved by the new "Wear Resister"—a Pettibone Mulliken development that stops destructive abrasion by protecting pump shell, side plates and liners at vital points. It prolongs pump life, reduces repair costs, eliminates costly shutdowns and steps up production. It contributes to the high record of Diamond Dredge Pumps for *wearability* under severe conditions.

Write for Bulletin of the new "Wear Resister," and read how it may be adapted to your installation.

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4712 Division Street, Chicago, Ill.

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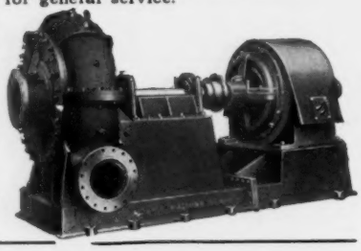
CENTRIFUGAL PUMPS

For hydraulic dredging, filling, sand and gravel production; hydraulic conveying of slurry and other liquids containing abrasive materials; clear water pumps for general service.

Also complete dredges with all accessory equipment. Dredging pump designs include heavy-duty types and special alloy parts for severe service. Types and sizes for the largest or smallest operations, and for belt, motor, steam, oil or gasoline-engine drive.



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Baldwinsville, N. Y.
Export Office: 50 Church St., New York.

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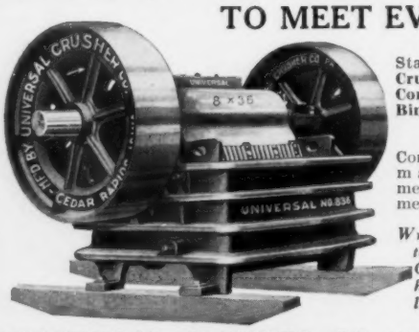
TO MEET EVERY NEED



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Crushers **Elevators**
Conveyors **Screens**
Bins **Pulverizers**
Crushing Rolls

Complete plants in many sizes built to meet individual requirements.

Write for catalogue and tell us your needs. Our engineers will help solve your problem.

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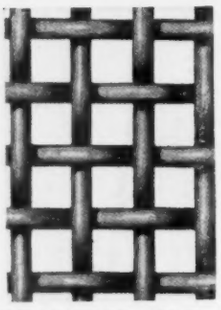
No Matter How Dirty Your Pit or River Deposits—

The Deister Overstrom Diagonal Deck Sand and Gravel Washing Table efficiently removes coal, sticks, clay, debris and contamination from dirty sand and gravel, producing a premium product. Capacity runs 20 to 45 tons per hour depending on size of material treated. Handles fine sand up to 2″ gravel.

THE DEISTER CONCENTRATOR CO.
911 Glasgow Ave. Incorporated 1906 Ft. Wayne, Ind.
New York Office, 104 Pearl St., New York

FIVE STAR FEATURES
of National Wire Cloth



- ★ Withstands vibration without crystallization
- ★ Super-tough to resist abrasion
- ★ Maintains accuracy throughout life of screen
- ★ Has outworn other special alloy cloths
- ★ Economical in price and serviceability

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CRUSHERS—Double roll and Sledge Wedge Crushers, for practically any product. Capacities to 1000 tons an hour.

SUPER DRY PANS—For especially large tonnages.

WASHERS AND SCRUBBERS—Steel log Washers; scrubbers, cylinder washers, sand drags and washing screens.

DRYERS—Revolving cylindrical, of various sizes.

JIGS—For concentrating and beneficiating hematite and manganese ores.

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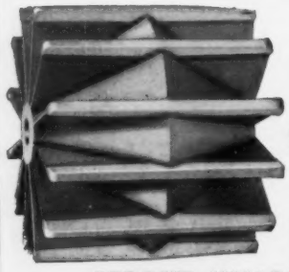
Hollidaysburg, Pa.

SAVE YOUR CONVEYOR
and Elevator Belts *with* SPROUT-WALDRON Wing Pulleys



Interchangeable with standard pulleys. Nothing can lodge between belt and pulley.

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Elevating, Conveying and Transmission Equipment

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SHOVELS-CRANES-CLAMSHELLS-DRAGLINES
3-4 yd., 1 yd., 1 1-4 yd., 1 1-2 yd., & 1 3-4 yd.
(A TYPE AND SIZE FOR EVERY JOB)

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Division Lima Locomotive Works, Incorporated
Lima, Ohio, U. S. A.

Advertise your wants and surplus equipment in

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BECAUSE it is the most successful, most satisfactory and most profitable—which fact you can confirm from users, and reason out from reading the Haiss catalogs. Four Standard Haiss Loaders—1 to 3 yds. per minute.

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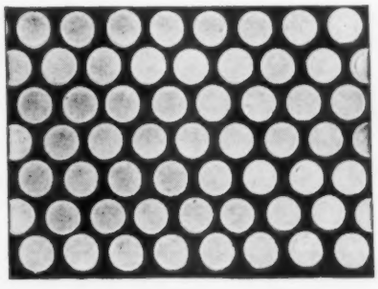
Builders also of HAISS ELEVATORS—SCREENS—CLAMSHELL BUCKETS

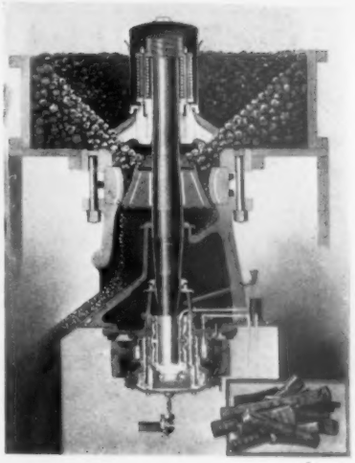
MORROW SCREEN PLATES



MORROW PERFORATED METAL SCREEN PLATES for sizing and preparing coal, sand, gravel, stone and other bulk materials are made by a Company specializing in screening machinery.

A complete set of punches and dies covering a wide range of sizes, in round, square, oval and diagonal slots are ready for the press, insuring prompt delivery of orders.

The Morrow Manufacturing Co.
Wellston, Ohio



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with
HALF THE POWER COST
Guaranteed!

The Kennedy Ball Bearing Gearless Gyratory Crusher is guaranteed to produce a greater tonnage than any other crusher of a given size, with half the power per ton of ore. This crusher can be equipped with a synchronous motor in its pulley, or driven by flat or V-belt from a standard motor.

The Savings Effected with this crusher are astounding:
In cost of Maintenance.....80%
In Power.....The entire cost of crusher and motor in pulley is amortized annually.

Sieving test on glacial gravel crushed at the rate of 18 tons per hour, with No. 19 crusher set to ⅛ in., and using less than 15 hp., follows:

Minus ⅜ in.	100%
Plus 3 mesh	21½%
Minus 3—Plus 4	17%
Minus 4—Plus 14	36½%
Minus 14—Plus 48	15%
Minus 48—Plus 100	4%
Minus 100	5½%

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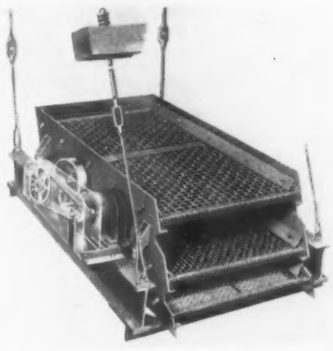
Double Strength

High-Class Workmanship and Material

Greatest Capacity Guaranteed



No repair parts sold after 4 years in use except screen cloth

Write today for our Catalog No. 16-P-1234

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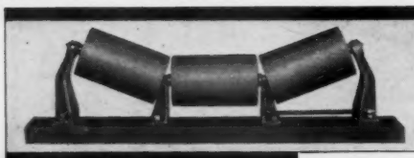

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DRYERS
SKIP HOISTS
ELEVATORS
CONVEYORS

● Equipped with Timken bearings and factory tested so that they are ready for immediate field service, B & S belt conveyor idlers give maximum performance. . . . They are easily lubricated. Standard sizes of flat and troughed design carried in stock for your convenience. Full details on request.

THE C. O. BARTLETT & SNOW CO.
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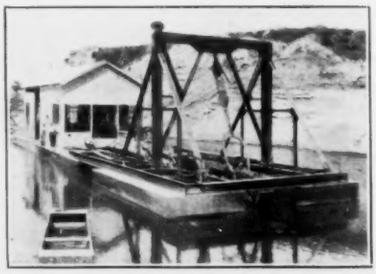

Will eliminate stoppages and slug pumping — insuring an even, constant feed of solids to the suction nozzle — with less power — greatly decreasing the cost per yard of material produced.

Write for descriptive literature and let us tell you how this can be done with your dredge.

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Des Moines, Iowa

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Performance-Tested

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REVOLVING SCREENS
CRUSHERS DRY PANS

Lewistown Foundry & Machine Co.
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- ☐ Air compressors
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- ☐ Bags, paper
- ☐ Balls, steel
- ☐ Barges, steel
- ☐ Belt dressing
- ☐ Belt fasteners
- ☐ Belting, conveyor and elevator
- ☐ Belting, transmission
- ☐ Belt lacing
- ☐ Belt plates
- ☐ Belt rivets
- ☐ Belt tighteners
- ☐ Bin gates
- ☐ Bins, concrete
- ☐ Bins, steel
- ☐ Blasting supplies
- ☐ Blasting powder
- ☐ Blocks, friction
- ☐ Boats, self-unloading
- ☐ Bodies, Motor Trucks
- ☐ Brake Linings
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- ☐ Buckets, Conveyor and Elevator
- ☐ Buckets, Dragline
- ☐ Buckets, Orange Peel
- ☐ Cableways, Slackline
- ☐ Calcining Machinery
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- ☐ Car Pullers and Movers
- ☐ Carriers, Belt
- ☐ Cars, Dump
- ☐ Cars, Kiln
- ☐ Castings, Manganese Steel
- ☐ Castings, Steel
- ☐ Chains, Conveyor and Elevator
- ☐ Chains, Power Shovel, Crane and Dredge
- ☐ Chains, Transmission
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- ☐ Clips, Wire Rope
- ☐ Clutches
- ☐ Clutches, Magnetic
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- ☐ Cranes, Overhead Traveling
- ☐ Cranes, Truck
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- ☐ Crushers, Disc
- ☐ Crushers, Gyratory
- ☐ Crushers, Hammer
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- ☐ Crushers, Roll
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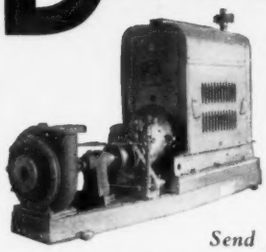

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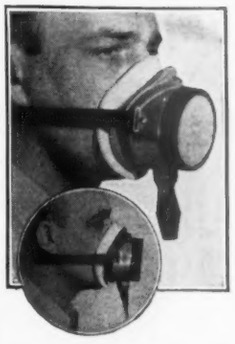

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2—3 and 5-roll Raymond High Side Mills.
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1—36x24″ Jeffrey Type D Hammer Mill
1—40x36″ Williams No. 6 Universal Hammer Mill.
12—Jaw Crushers—24x36, 36x30, 42x60 Farrel; 36x42, 42x48, 30x60 Traylor; 56x72 Buchanan; 42x40, 48x60 Allis Chalmers.
5—Symons Cone Crushers—2 ft.; 5½ ft.; 2—7 ft.
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9—Crushing Rolls—8x5, 20x14, 36x16 Sturtevant; 30x10 Colorado Iron Works; 36x16, 42x16 Allis-Chalmers; 36x16, 42x16 Traylor.
5—Air Separators—30″, 10′, 12′, 14′.

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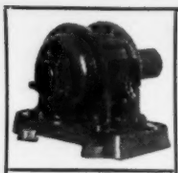

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Birmingham, Alabama

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1—Sturtevant No. 1 Ring Roll Mill.
4—Gates Gyratory Crushers No. 3D, No. 6D.
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3—Raymond Mills, two roll, four roll, five roll.
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1—Symons 7′ Cone Crusher.
4—Tyler, Sturtevant Vibrating Screens, single and double units.
6—Hammer Mills, Jeffrey, Williams, Sturtevant.

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600	G. E. syn.	860	MOTOR GENER.
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600	G. E. syn.	257	
600	Al. Ch. syn.	240	
3-675	Al. Ch. syn.	900	CENTRIF. PUMPS
400	West. sl. rg.	514	3-14,000 G.P.M., 150′ Head dir. conn., 675 hp. Al. Ch. 900 r.p.m. syn. motors.
400	Al. Ch. syn.	300	
300	Al. Ch. sl. rg.	585	
260	Al. Ch. syn.	720	1-14,000 G.P.M., 60′ Hd., dir. conn. 260 hp., Al. Ch. 720 r.p.m.
250	West. sl. rg.	720	
200	G. E. sl. rg.	1200	
200	West. sl. rg.	500	
200	F. M. sl. rg.	600	
150	G. E. sl. rg.	1750	
150	G. E. sq. c.	1750	
100	Cr. Wh. syn.	225	

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1—Chgo. Pneu. 220′ portable gas Compressor.
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1—⅝ yd. Owen Digging Bucket.
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2—Domestic 4″ Self Priming Pumps.
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No. 0-No. 1 and No. 2 ring roll mill.
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Swing hammer mills.
3′x25′-4′x30′-5′x50′-5½′x40′-6′x50′ direct heat rotary dryers.
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Rotary cement kilns from 3′ to 8′ diameter.
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No. 000-No. 00-No. 0-No. 1—Raymond mills.
One 6′x8′ Traylor ball mill.
5′x12′ and 4′x10′ rod mills.
Tube mills from 4′ to 7′ in diameter.
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12″ American Manganese Steel with 200 HP. 3/60/440 Gen. Elec. slip ring motor.

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25 KVA. 1800 RPM. 3/60/2300 Fairbanks-Morse.
37 KVA. 1200 RPM. 3/60/220 General Electric.
150 KVA. 600 RPM. 3/60/220 General Electric.

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100 HP. 250 RPM. Bessemer semi-diesel.

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50 HP. 900, 3/60/440 Gen. Elec. slip ring.
60 HP. 900, 3/60/220 Gen. Elec. sqrl. cage.

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Erie ¾ Yd. Steam Shovel on Cats.
8 Ton Plymouth Std. Ga. Gas Locomotive.
5 Ton 48″ Ga. Plymouth Gas Locomotive.
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1 Std. Ga. Nordberg Track Shifter.
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856′ Sullivan Ang. Cpd. Air Compressor with 152 Hp. 220 V. A.C. Motor Belted.
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Springfield, Ohio

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Swing Hammer Mill
30″ Diameter—30″ in Width

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Approximately 20 tons, 20 pound rail
20—2 way made up steel switches
3—3 way made up steel switches
3—Fordson Tractors
1—Walker & Elliott Rotary Crusher
1—A. S. Cameron Pump, complete with 15 HP motor direct connected.

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1—3 x 8 vibratory screen, 2 deck.

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Portable and stationary, belt, with elec. or gas. power, sizes from 21 cu.ft. to 1000 cu ft.

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246—Buckets, all sizes and makes.

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Large lot including std. ga. 6 and 12-yd. and 20-yd., 36-ga. 5 yd. and 24-ga. 1½-yd. Also std. ga. flat cars and ballast cars.
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5—Locomotive cranes; sta. ga. 30 and 25-tons; Ohio, Browning, American, Industrial.
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Steel and wood, stiff leg, or guy; from 5 to 50 tons.

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CRUSHERS
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1—Set Power and Mining Machinery Co. crushing rolls, size 42 in. x 16 in., rated capacity 15-20 tons per hour of ⅜" material; weight 41,000 lbs.
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2—No. 3 McCulley gyratory crushers; size of each opening 7"x28"; capacity 25 tons per hour of 2¾" material; 11 tons per hour of 1¼" material; weight 17,000 lbs.

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2—Allis Chalmers roller type, all steel, heavy duty, 48 in. dia. by 24 ft. long screen in 3 sections.
2—P & M Roller type, 48 in. by 18 ft. long.
1—Allis Chalmers, roller type 51" dia. by 21 ft. long.

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3—Gardner Denver wagon or derrick drills with Model 21 or 17 Gardner drills for channelling.
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1—20 Ton Fairbanks Scale.
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IMPROVED CONCAVES
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National Sand and Gravel Association
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For Information
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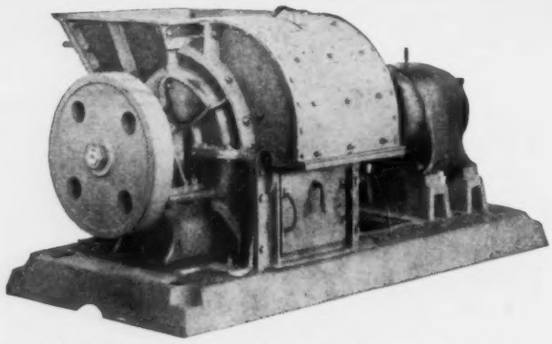

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LOW FIRST COST makes the American Crusher a prime investment. Easy to install, dismantle and move.

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Write today for facts on why the American Rolling Ring Crusher gives a more uniform product, with minimum fines and no slivers or chips.

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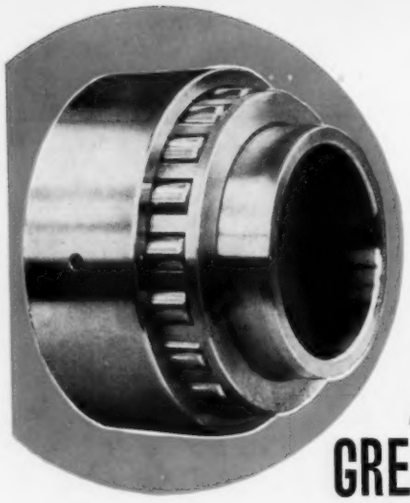
☐ Remittance Enclosed

TEAR OFF HERE

Roller bearings  *for*

GREATER SPEED
LARGER CAPACITY
LOWER UPKEEP

Roller bearings—in your automobile . . . in railroad locomotives and rolling stock . . . in all modern machine tools . . . in power shovels . . . in conveying equipment. *Why not in your rock crusher?*

Telsmith-Wheeling Jaw Crushers . . . *in all sizes* . . . are equipped throughout with *cylindrical roller bearings* because—

1. The shaft of a Telsmith-Wheeling is not subjected to wear. All internal frictional wear is taken on the bearing races. (In a plain bearing crusher both shaft and bearings are subject to wear.) 2. Telsmith Roller bearings both retain their lubricant and exclude dirt. (Plain bearings permit lubricant to run out and dirt to penetrate, scoring both shaft and bearing sleeves.) 3. With roller bearings, bearing centers are shortened and danger of shaft deflection is reduced. 4. Roller bearings save power. One man can turn over a large size Telsmith-Wheeling with ease. (A much smaller machine of the plain bearing type will defy two men.) 5. Roller bearings permit higher speed and larger output.

But, lower maintenance is the biggest argument for roller bearings, even though their first cost is a little more. They save that premium many times over in reduced upkeep and longer life. *Write for Bulletin W-15.*

JUN 3 1935

WHEELING **TELSMITH JAW CRUSHER**

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